# FINANCIAL FEASIBILITY OF PUBLIC-PRIVATE PARTNERSHIPS RENT-CONTROL ON-CAMPUS STUDENT HOUSING

A Thesis

by

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# ABSTRACT

This research considers White Creek Apartments at Texas A&M University and Prince House at National Taiwan University as the research objects, and principally the financial feasibility of these two dormitory projects is discussed and the economic model is used to discuss the utility of this form of providing housing. The two examples were chosen because they represent simple examples from two major economies of interest, the US and the Taiwan economies. The charging rates at Prince House are similar to those of White Creek Apartments, which makes the economic comparisons somewhat simpler.

In this thesis, the Public-Private Partnership (PPP) project financing method is briefly introduced as a construction model for other such facilities. Two projects that used PPP are analyzed for this simple case study. The research reviews these projects in different financial climates, and calculates the effect of the financial aspects of the projects and the local economy on the projects' viability. Finally, the hypothesis that projects financed by Public-Private Partnerships are financially robust against diverse economic circumstances is shown to be true for these two projects.

During the analysis of financial feasibility, White Creek Apartments shows a strong income source due to their choice of floor plans. Nevertheless, Prince House has more steady net present profit because of their use of different funding mechanisms, interest rates, and repayment periods. The conclusive reason for the difference in profit is the different characteristics of equity, loans, and bonds. If the initial interest amount is

kept the same, a project financed by bonds will cost more. Also, the market interest rate will make the initial repayment larger if the private company chooses to obtain a loan.

White Creek Apartments and Prince House both have strong financial feasibility, as their design fits the demand. The difference in financing methods is based on their different financial objectives, such as repayment flexibility or initial repayment amount.

Either model works, although in the long run, one wonders at the ultimate utility of state provided facilities of this form.

DEDICATION

To

My family

My friends

And

Who believe I can.

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I would like to thank my committee chair, Dr. Nichols for his help and patience in guiding my research. Also I appreciate the guidance and support throughout the whole process from Dr. Glowacki and Assistant Dean Feigenbaum. I express my gratitude as I would not have accomplished this study without them.

# NOMENCLATURE

| | |
|---|---|
| BOT | Build-Operate-Transfer |
| CPI | Consumer Price Index |
| NPV | Net Present Value |
| NTD | New Taiwan Dollar |
| NTU | National Taiwan University |
| Prince Corp. | Prince Housing & Development Corp. |
| PPP | Public-Private Partnerships |
| PPPIP | Act for Promotion of Private Participation in Infrastructure Projects |
| Sq. Ft. | Square Feet |
| $ft^2$ | Square Feet |
| TAMU | Texas A&M University |
| USD | United States Dollar |

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# CHAPTER I

# INTRODUCTION

## BACKGROUND

This research uses a case study of two dormitories, one in Taiwan, and one in the USA to consider the utility of providing on-campus housing for students. This thesis provides a brief literature review, outlines the methods used for the research, provides a simple set of economic models consistent with the difficulty of the problem being considered in this work, considers the results for the hypothesis, and provides a set of conclusions.

This chapter outlines the concept of student housing, private and public partnerships, provides the problem statement, the aims and objectives, the hypothesis, the limitations of the research and the significance of the work.

## STUDENT HOUSING

Student on-campus housing is usually a critical resource for both the university and students. Dormitories usually occupy large portions of the university properties, but are not very profitable. Renovation or reconstruction of existing dormitories or development of new buildings is not as appealing as expansion or inauguration of research facilities and laboratories. In addition, compared to campus landscapes and sport stadiums, dormitories may not be the most important factor in attracting student to a school; this is especially true for students who plan to live off-campus. Therefore, considering the financial aspect, having dormitories on campus is not always viewed as a good bargain.

However, most outdated and un-renovated dormitories no longer satisfy students and parents. The lower customer satisfaction and higher rents on campus tend to cause students to move out. Even though the on-campus housing is more convenient for the freshmen, the negative living experience outweighs the advantages of on-campus housing.

Some universities force freshman students to live on campus for social reasons.

Some universities are now trying to attract and pull students back from their cozy off-campus housing by competitive location and improved services and amenities, including renovated or brand-new facilities and buildings. The more students commute each day, the higher the likelihood of an accident occurring is a simple way of looking at the problem. A large number of commuters worsens traffic conditions and the neighborhood living environment.

Most countries, including the U.S., plan to improve their national competitiveness by increasing their investment in higher education.

In Asia, due to the Asian Financial Crisis in 1997 and the Global Financial Crisis in 2007, two financial crises that happened within two decades, most Asian countries started to tighten monetary policy and raise the reserve currency to strengthen their financial ability and prepare for the next global financial problem. These policies, along with the decrease in foreign investments, caused these nations to lose the extra resources they would otherwise invest in higher education. It meant that the university could not get enough money from the government.

## PUBLIC-PRIVATE PARTNERSHIPS

Public-Private Partnerships (PPP) is a public construction procurement or financing method. This method increased in popularity due to diminished national budgets and lack of confidence in government ability to provide quality services or public works. In its original conception, a PPP project was designed to allow a private sector company to provide what are considered government services, or to manage what are considered to be public projects. It entails some contract between the government and the company in which both sides benefit. The company benefits in the following way. In the PPP, the government provides the company some exclusive rights to some service or project, such as building an airport, hospital, highway, railroad, port, school, etc., which is considered property of the company for the duration of the contract. In some contracts, the property required in order to fulfil the public service is rented to the company. The government benefits in several ways, chief two among them are (1) the government benefits by avoiding construction costs, as construction is the responsibility of the partner company, and (2) private sector companies usually have superior technology, and as a result, often offer higher quality services and are more likely to lead to successful projects.

In traditional government procurement projects, the government has total control of the project. The government has the power of public authority to give or withdraw privilege anytime. In these one-sided power relationships, where the government is both the boss and law, projects are volatile, which is risky to the contractor. Perhaps most importantly, in such traditional projects, contractors are seldom concerned about the

public interest or the quality of the project, but usually focus on immediate profits. In PPP projects, a mutual respect partnership is much more important than the roles of owner and contractor.

Some public service projects require certain patents or exclusive technologies. Examples are water treatment facilities and nuclear plant operation. In general, there are many services that the government cannot provide without assistance from private sector service providers. Many such companies are very profitable, and do not need the government in order to thrive. To provide such services, the government must attract these companies with good contracts. PPP is a good candidate for this.

Influenced by the United Kingdom, several countries passed exclusive laws for PPP projects. Usually these regulations gives governments more flexibility in executing PPP projects. These laws help circumvent government procurement regulations that prevent the government from partnering with private companies. PPP exclusive regulations also provide tax preferences and incentives.

Traditional government procurement usually favors the company with the lowest bid price. Under this method, certain companies have no interests to participate. But through the PPP, the government shares the risk and profits with the contractor. This means if a contractor makes the project more profitable, it shares more profits. In addition, the government could take a more active role, using its public authority to solve difficulties appearing in the project. In this way, PPP projects have reduced risk compared with traditional projects. Sharing the risk and profits, a partnership in which

partners with different strengths help one another accomplish the goal of public service, is the core value of PPP.

A successful partnership in a PPP project starts with a fair and responsible contract. The PPP contract is similar to a real business contract, unlike a government authority contract. All arguments and disputes are based on business negotiation, attribution, or lawsuits. Under the contract, government cannot make any decision without the agreement with its partner (this is to be contrasted with the traditional procurement method). Therefore, the reliability of the partner supersedes projected profits and the quality of the project plan. A perfect proposal and high revenue return do not guarantee a successful project, but a responsible partner would. Damage due to a failed public service project could prove more expensive than its sunk cost; this cost is carried by the public.

During the partnership period, clear responsibilities and duties are included in the contract; anything apart from these terms must be negotiated. Most authorities hire lawyers before the bidding process to ensure the contract terms would not endanger the public interests. Designing a fair and useful contract is the fundamental element of the PPP project, and it is usually the most difficult pre-work. The contract is very important, as PPP contracts could last a century. An example is the Channel Tunnel, whose PPP contract lasted 99 years (originally a 55-year contract). To protect the parties involved, some PPP contracts require the two parties to revise the contract on designated years. The arrangement of revising contract could adjust the contract to fit changing economic

circumstances. It also allows for removing improper terms or enhancing the strength of project finance and operation.

The funding source is very important in a PPP. Most PPP projects request the contractor take responsibility to obtain the funding for the project. Funding could come from the stock market, specific investors, a bank loan, or the bond market. The funding method choice depends on projected revenue. For example, a toll road project has steady incoming cash flow, and therefore, the contractor could easily be awarded a low annual interest loan from a bank, without the need to issue securities or bonds to outsiders. Issuing securities or bonds by a company can avoid the process of credit review, and allows the company to have a more predictable cash flow schedule. This is because the bond or security issuing process is done at the whim and according to the schedule of the issuer, while a bank loan is granted upon review and as the bank is ready (which may not coincide with the schedule of a contractor). A company with a strong financial balance sheet can issue securities and bonds with premium. The premium means the security or bond buyers pay more than the face value written on the security or bond. Issuing with premium, a company can save a lot of interest paying to the bond owner, or can issue less stock shares to investors. A company with a lower credit score has no choice but to issue stocks or bonds with a discount. This means that it will receive less money from creditors or stockholders, but pay back more money or issue more shares.

Some projects are not profit oriented or are highly risky, such as homeless residence, violence and sexual assault shelter, or social security service. For such projects, the government could offer partial or even entire construction cost funding to

the bid winner. Projects could still be considered PPP projects even if the project cost is covered by the nation or the operation expense paid by the government.

## PROBLEM STATEMENT

Several universities in Taiwan still provide traditional dormitories. Figures 1 and 2 (Office of Student Affairs NCHU, 2011) show four-bed rooms and six-bed rooms, which may be equipped with concrete beds, public bathrooms and restrooms. The decoration of these old dormitories is pretty simple and easy to maintain.

*Figure 1*. Concrete Beds in a Six-bed Male Dormitory, from Office of Student Affairs NCHU (2011)

*Figure 2.* Concrete Beds in a Four-bed Male Dormitory, from Office of Student Affairs NCHU (2011)

However, the younger generation prefers having their own private bedrooms and bathrooms. These dormitories were constructed inside a public university using traditional procurement methods and was maintained by the university itself. Utilizing traditional procurement methods, the dormitories were constructed by a private contractor, whose sole concern was project cost. The contractor had little regard for the dormitory's inhabitants, which resulted in a poor dormitory. It is clear that the conditions

in the dormitory are awful, as briefly explained below. The public bathrooms are located outside of the dormitory units, and the hallway is not enclosed, so that in the winter students are forced to shower in freezing ambient temperatures. The dormitories are also overpopulated. The population of a dorm might be attractive as part of a bid, but is not healthy for the residents. Over one-hundred students at each floor have to share an insufficiently small number of bathrooms. This leads to a shortage of hot water and long waiting lines for residents. Sanitation of the public restroom is a big issue in both the male and female dormitories, because the university (who manages the dormitory) does not invest enough money in hiring cleaning staff. The situation in the school-run dormitories is so poor, that students avoid going to the restrooms, and use the restrooms in their department buildings instead. The uncomfortable environment is the main factor pushing students to move out of the university-run on-campus dormitory.

The university was aware of this situation and attempted to make some improvements. For example, Figure 3 shows that the university added more head bins for students to store personal belongings (Office of Student Affairs NCHU, 2010). However, small-scale improvements cannot solve the old dormitory's problems entirely. Students will continue to suffer from living in poor conditions. In this situation, a new dormitory is needed.

The reason the university did not build a new dormitory is that they lack the money to undertake such an expensive project. The decrepit dormitory issue was not exclusive to this school, but many Taiwanese schools shared this and the funding problem. Shortly after the legal environment became friendly to PPP with the signing of

the Act for Promotion of Private Participation in Infrastructure Projects (PPPIP Act)(Ministry of Justice, 2000), PPP projects started emerging and proved successful. PPP became popular, and some universities took steps to understand it, and then applied it.

*Figure 3.* Traditional Four-bed Room, from Office of Student Affairs NCHU (2010)

Prince Corp. is an example of a private-sector company that is involved in several PPP projects with universities. Prince Corp. built and now operates the new dormitories "Prince House" dormitories in both National Taiwan University and National Cheng Kung University. These projects are attractive to young students, and provide air conditioning, small appliances, private bathrooms, etc. which old dormitories did not provide. Therefore, PPP, projects funding by private, seems to be a good new idea and effective method to solve the student and university's problem. In the following, PPP is currently considered as a financially robust solution for solving the decrepit dormitory problem.

Due to the flexible finance operation, the private funding might be able to help the dormitory projects endure a variety of economic situations.

This research considers two dormitory projects from two different countries to test their financial feasibility. Different interest rates, repayments, and inflation rates apply to the financial feasibility when examining these two projects.

## AIMS AND OBJECTIVES

This research aims to develop a basic economic analysis of two major PPP projects. This work concentrates on the projects' methods of finance and economic feasibility. To accomplish these goals, this thesis focuses on the two projects: White Creek Apartments at Texas A&M University and Prince House of National Taiwan University.

The project finance data from two dormitory projects is analyzed to generate the financial feasibility. This research considers different repayment periods and different loan rates to test the feasibility under better and worse economic situations.

## HYPOTHESES

The hypothesis addressed in this thesis is that projects financed by Public-Private Partnerships are financially robust against diverse economic circumstances.

## LIMITATIONS

The research limitations are

- Comparing two university dormitory projects in two cities and two countries makes it necessary to level differences of currency, Consumer Price Index, weather, culture, and customs.
- The public financial data is sometimes overstated.
- There is no public financial feasibility report or research from either university.
- The occupancy rate and inflation rate are challenging to predict.
- Financial feasibility is unlikely to be conducted when there is a long-term contract.
- Neither university has PPP-exclusive websites or data centers, so sometimes the same topic from different sources might have different information.

## SIGNIFICANCE

Universities expect that funding from the private sector can solve the problems of outdated, unsatisfying, and insufficient on-campus housing. Neither White Creek

Apartments nor Prince House are funded by their university, and the two projects are not exactly the same. The introduction of two different PPP projects can provide different perspectives on on-campus student housing.

PPP helps both universities rebuild the campus scene. The financial capability of PPP dormitory projects appears strong and amazing. The financial feasibility test could help the public to understand that PPP is a good solution to the higher education budget shortage.

# CHAPTER II

# LITERATURE REVIEW

## INTRODUCTION

In this chapter, PPP dormitory projects in United States are reviewed, along with the current situation of on-campus and off-campus student housing. There are an increasing number of public universities undertaking Public-Private Partnership (PPP) as a solution to resolve issues caused by skyrocketing demand for both on-campus and off-campus dormitories.

## PUBLIC-PRIVATE PARTNERSHIPS IN UNITED STATES

In the United States, some public-sector entities adopt Public-Private Partnerships as an alternative procurement method for public construction projects. Kennesaw State University suffered from the rapidly increasing academic population, compelling it to provide enough housing for students coming from a distance (Sanseviro, 2010). At the same time, the university also transformed from a community college to a research university. Sanseviro (2010) suggests that the private-sector is usually able to solve problems more efficiently and effectively. If the school lacks construction or operation professionals, a private partner can help the school to undertake extensive construction projects without the need for hiring excess personnel or running risks when putting the task into practice. However, because the government partner often expects their private counterpart to be more invested in the project, the government partner often does not realize its importance to the project, and as a result, its contribution is at times lacking. Sadly, this is all too common, and most Public-Private Partnerships projects got

into trouble due to carelessness of the owner (government) side. A partnership is successful when all stakeholders are involved in the project, both at its start, and while it is ongoing. Whether in the traditional design-(bid)-build or in Public-Private Partnerships, mutual trust and confidence are always hard to achieve. Being a partner, if you cannot generate reliance or confidence towards the other name on the contract, conflict may even start right after it is signed.

Some people worry that a universities awarding the dormitory operation exclusive contract to a non-government group would come at the expense of the students. Not everyone holds this pessimistic view, remembering that Public-Private Partnerships is all about two partners (Riccio, 2014). Riccio is one of the optimistic experts who believe that public benefit can be secured even by private sources. He surmised that the Public-Private Partnerships are the best connector for linking the public concerns with private profits. Perhaps even more so than Sanseviro, he emphasizes the importance of private-sector involvement. Because the contract type and permission period of Public-Private Partnerships projects are usually complex and longer than those of traditional construction, operation, and maintenance procurement ones, the government should focus more heavily on its partners than on procurement, design groups, or general contractors,. The government and contractor should make the contract clear and complete, lest it goes to court, because Public-Private Partnerships contracts are civilian contracts, not administrative procurement contracts. If possible, a contract should be simple and devoid of unnecessary runaway conditions. One issue is that the Public-Private Partnerships projects are difficult to initiate, which is often due to

inexperienced staff in both parties, public officers and private stakeholders. Hiring at least one person who has comprehensive experience executing a Public-Private Partnerships project is helpful. If someone considers going the Public-Private Partnerships route, having a comprehensive talk with an expert could prove valuable.

## ON-CAMPUS AND OFF-CAMPUS

Strickler (2007)conducted a survey on student housing partnered by state institutes and their civilian developers for two decades. As a professional student housing consultant, his company performed a wide-ranging survey of 345 projects from 1995 to 2008. With such a huge dataset, a trend of decreasing off-campus units but increasing Public-Private Partnerships on-campus housing units was shown. The most active area of student housing by Public-Private Partnerships is the Southern U.S. area, due to the large number of newborn and incoming citizens. Texas is one of the exceptions; most of the traditional student housing units are lower-level housing, like apartments or wooden-garden condos. Usually the off-campus apartments are designed with a single-room pattern for high-end tenants. That strategy allows these compounds to provide more benefits than a university dormitory. However, some universities have started to strictly compete with outside developers, providing on-campus single-bed suites.

The other finding involves the available indoor space. Due to the different cost of property, on-campus dormitories are often smaller than their off-campus competitors. But the total cost, whether measured in beds or in square feet, is only slightly different. It used to be less costly for private owners to build apartments, but universities started to

keep up with them according to Stickler's research. The markets of student housing were dominated by private owners before universities started to have their own affiliations especially in 1999. Regarding smaller universities, these do not have enough outside resources or the ability to set up their own foundation to execute dormitory projects. Universities that have 2,500 to 20,000 students prefer to control and own their projects via surrogates. If the student population is over 20,000, maintaining flexibility between developer and affiliate would be wise. Whether based on Stickler's own survey, or reporst by College Planning and Management, or studies by American School and University, the Public-Private Partnerships—with private companies or with university affiliates—have become the positive trend of student housing.

Wiewel, Gaffikin, and Morrissey provided a different opinion concerning a new issue of the balance of partnerships between developers and universities, and the rent that students were charged for on-campus living (Wiewel, 2000). They focused on the cooperation between community, including developers, and university to provide reasonable expenses for the students who are not economically well-off. More important than competing for luxury was avoiding the raising of monthly payment and increasing the outstanding balance of student loans. The benefits of the partnerships were mentioned extensively by the other researchers, but there is one critical topic that is rarely mentioned: whether the university culture is amenable to a partner relationship. The private developers are adept at financial resources, technology, and proficiency management. On the academic side, schools know how to manage students, earn the trust of parents, and have practical experience of dormitory construction. The

information sharing of rent statistics can also help both sides estimate the probabilities of needs and wants. Some universities thought providing funds for their employees and faculties would help. However, this strategy could only raise the price of the nearby real estate, and it places the neighborhoods in trouble without helping produce a positive transformation. Intense collaboration with local housing can not only provide reasonable price for the students, but also make it possible to create opportunities of parttime jobs or internships working in leasing offices, which is especially important for students who need to live on their own. Also mentioned were the important factors of a successful partnership. Perhaps chief among these is the need for open-mindedness towards the administration and partnerships because the project belongs to all the stakeholders. The public relations departments should transfer their bureaucratic attitude from old-style in order to attract civilians to agree to long-term commitments.

While receiving financial support from private companies, a university should be able to provide better service to the students who live in on-campus dormitories, including better in-room facilities, shared facilities, or optional extra services at a cost.

## SUMMARY

Public-Private Partnerships help the university rebuild and enlarge on-campus student housing. However, as the new on-campus dormitory needs to compete with private residential apartments, the service quality and rent rate must remain competitive. The university can cooperate with local communities or the private sector to achieve this goal. The relationship between the university and its partner should be solid and mutual.

The abilities of the private developer, especially in finance, would be an important topic for the university to ensure the project may proceed with minimized turbulence.

New dormitory projects should be financially able to withstand severe economic conditions and retain high quality service. Therefore, the project finance needs to be validated before commencing.

# CHAPTER III

# METHODOLOGY

## INTRODUCTION

This chapter also outlines the methodology of financial feasibility, which apply to the two cases in this research. The financial data is collected from public resources.

A detailed description of two PPP dormitory projects is given, because of the difference between the two countries including their background and their current economic status.

Subsequently, several financial feasibility evaluations are generated to see if these projects are able to endure different economic conditions. This research will take the major cost and income of a dormitory project into consideration, and develop a basic understanding of the PPP project's financial feasibility.

## FINANCIAL FEASIBILITY MODEL

A PPP contract is a long-term contract. One of the general shortcomings of long-term contracts is the difficulty in prediction of the economic situation ahead five or even ten years. If PPP projects cannot pass some financial feasibility threshold, the project planner should consider adding some more incentives for potential bidders.

This research takes White Creek Apartments and Prince House as tests of financial feasibility. White Creek Apartments is operated by Texas A&M University, and therefore, the contractor Balfour Beatty Campus Solutions LLC is unable to raise the rent on its own. A similar situation applies to Prince House, where National Taiwan University holds the decisive rights to change the rents. If Prince Corp. (the contractor)

wants to charge higher rates, they need to negotiate with NTU and the NTU Student Association. For this reason, unlike the commercial building projects, the rent fluctuation is in practice determined by inflation, and or internal considerations in the PPP partnership that may be driven by non-rational motives.

## BACKGROUND OF WHITE CREEK APARTMENTS

In August 2003, Texas A&M University sought outside resources for the Campus Student Housing Master Plan (Brailsford & Dunlavey, 2007). This plan is also related to Texas A&M University Campus Master Plan (CMP) which is approved by Texas A&M University System Board of Regents in 2004 (Brailsford & Dunlavey, 2007). Following the Board of Regents, the Council for the Built Environment (CBE) executed and supervised the Campus Master Plan with fundamental principles and components to help Texas A&M University build the better architecture and landscape (Brailsford & Dunlavey, 2007). Under Vision 2020 strategic plan, the new plan was composed of strategic, conceptual-level, financial, and market analysis. There are thirty-two projects which are placed in the Campus Master Plan and had been performed and finished between 2004 and 2015 (Division of Finance and Administration, 2016), including Kyle Field Redevelopment, Francis Hall Renovation, and White Creek Apartments, which were the last three projects finished in 2015 (Division of Finance and Administration, 2016).

The new dormitory project is named White Creek Apartments. The apartments are designed as a three-building residential area with 1,274 beds, as shown on Figure 4. The project cost and value is estimated as USD$121 Million, and the financial resource

is the Tax Exempt Bonds. The contractor, Balfour Beatty plc, applied the funding to build the White Creek Apartments (Balfour Beatty Campus Solutions, 2013). After the basic finishing of decoration, fire, and safety inspection, the apartment started accepting tenants in August, 2015.

*Figure 4.* Aerial View of White Creek Apartments, from White Creek Apartments (2015)

White Creek Apartments, as Figure 4 shows, is located at 225 Discovery Drive, College Station, Texas 77843, on the West Campus of Texas A&M University and

northwest side of College Station. The academic departments nearest White Creek Apartments are Medicine, Agriculture, Business, and Government and Public Service. To reach most other departments, it is necessary to take on-campus buses. Since most properties around this apartment belong to the government, there are no commercial areas or personal stores, which can be readily accessed by the tenants. Figures 5, 6, 7, and 8 show the Façade of the apartment after opening (White Creek Apartments, 2015).


*Figure 5.* White Creek Apartments Façade, from Department of Residence Life (2016)


*Figure 6.* Garden in White Creek Apartments, from Department of Residence Life (2016)


*Figure 7.* Entrance of White Creek Apartments, form Department of Residence Life (2016)


*Figure 8.* Street View of White Creek Apartments, from Department of Residence Life (2016)

## DESIGN OF WHITE CREEK APARTMENTS

Table 1 shows the six different floor plans for Texas A&M University students to select from, including single room and multiple-tenant rooms. Figures 10, 11, 12, 13, and 14 show that all the units with more than one room have shared bathrooms (Department of Residence Life, 2016).

Table 2 shows that the bedrooms are fully furnished as some off-campus housing are, and Table 3 shows that the compound has similar facilities to off-campus counterparts.


*Figure 9.* Relative Location of White Creek Apartments, from Google Earth (2016)

Table 1

*Floor Plans*

| Style | Bedroom | Bathroom | Amount (bed) | Price (monthly) | Size ($ft^2$) |
|---|---|---|---|---|---|
| A | 4 | 2 | 348 | 769 | 1,181 |
| B | 4 | 4 | 660 | 822 | 1,292 |
| C | 2 | 1 | 194 | 875 | 739 |
| D | 1 | 1 | 30 | 1034 | 437 |
| E | 2 | 2 | 4 | 955 | 889 |
| F | 2 | 1 | 10 | 955 | 933 |

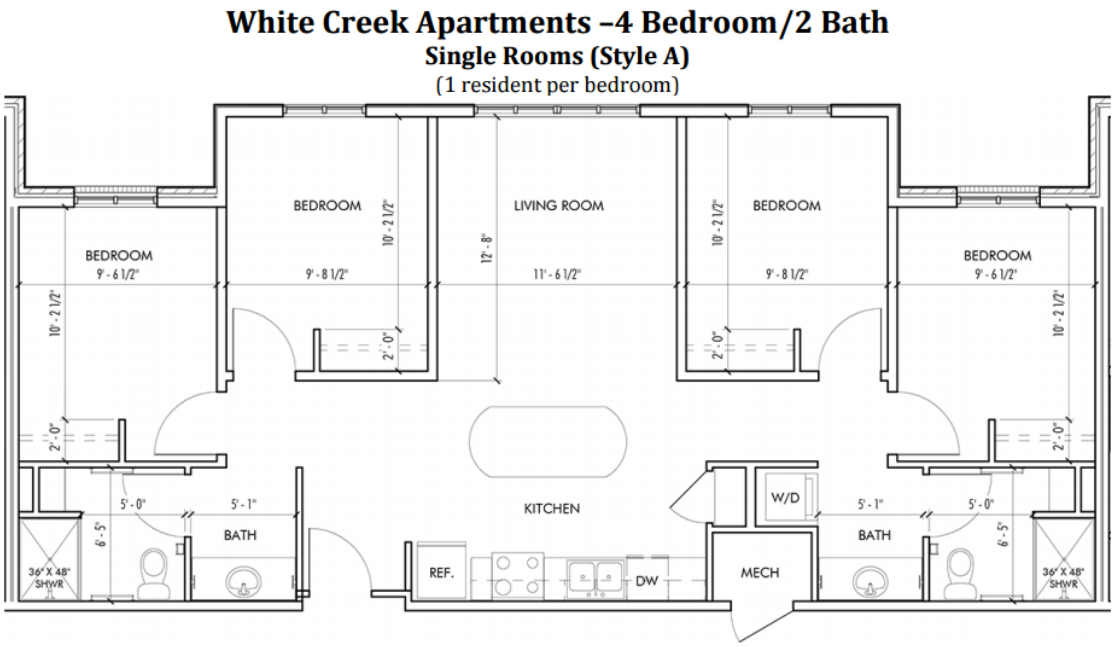



*Figure 10.* Layout of Four-bedroom with Two-bathroom, from Department of Residence Life (2016)

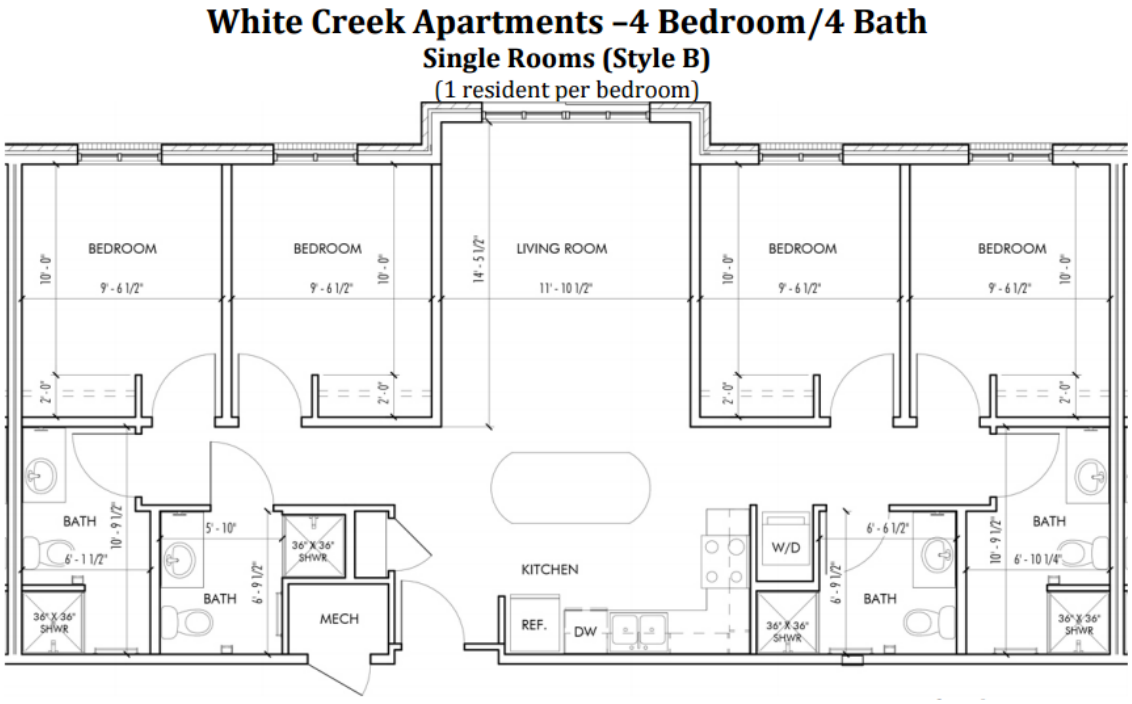



*Figure 11.* Layout of Four-bedroom with Four-bathroom, from Department of Residence Life (2016)

Table 2

*Facilities and Amenities in Bedroom*

| Facilities and Amenities | |
|---|---|
| Full-size bed with mattress | Dresser (underbed) |
| Nightstand | Desk with pedestal |
| Desk | Shared bathroom |
| Chair | Ceiling fan |

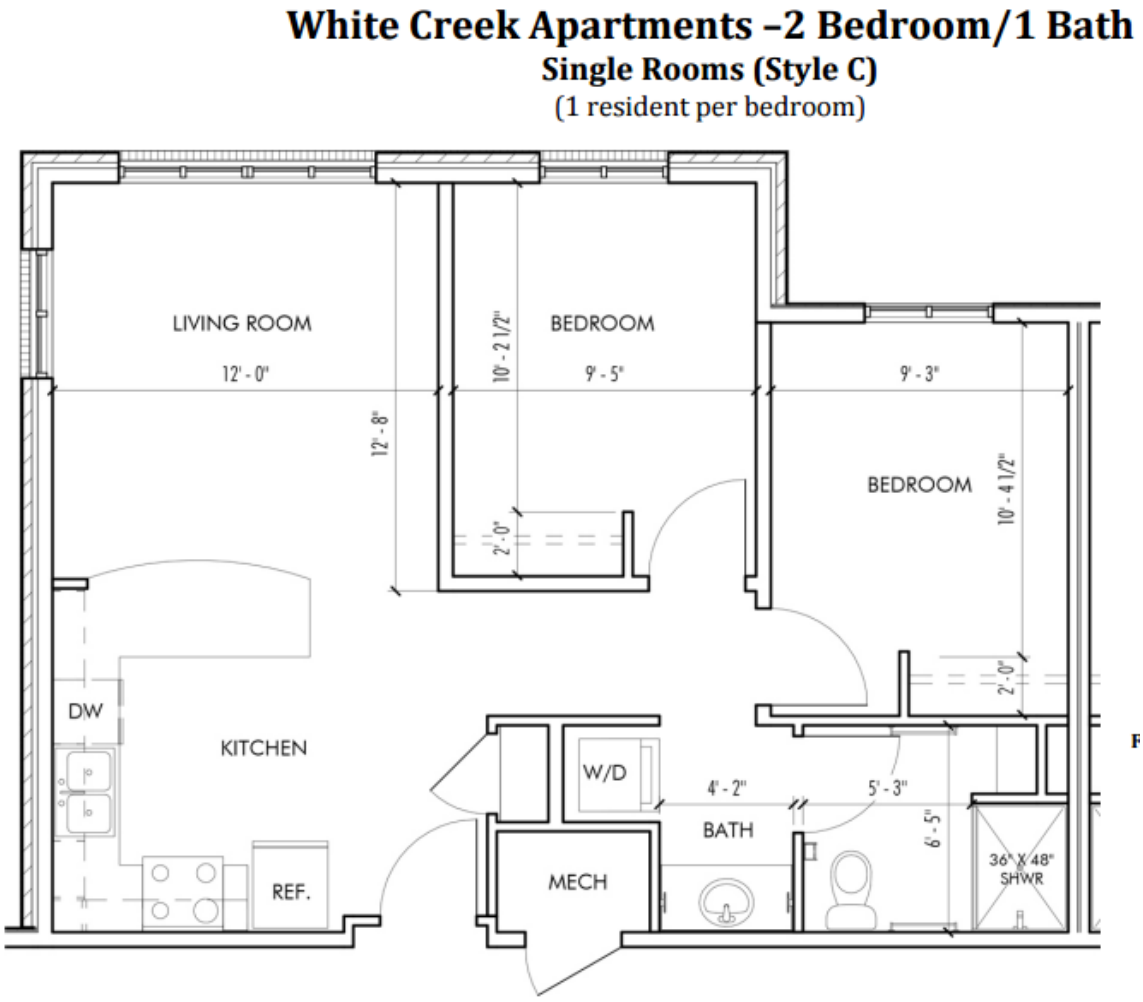



*Figure 12.* Layout of Two-bedroom with One-bathroom, form Department of Residence Life (2016)

Table 3

*Facilities and Amenities in Apartments*

| Facilities and Amenities | |
|---|---|
| Living room | Dining room |
| Ceiling fan | Washer/Dryer |
| Stove with oven | Microwave |
| Refrigerator | Garbage disposal |
| Dishwasher | Wood plank, ceramic, and carpet |

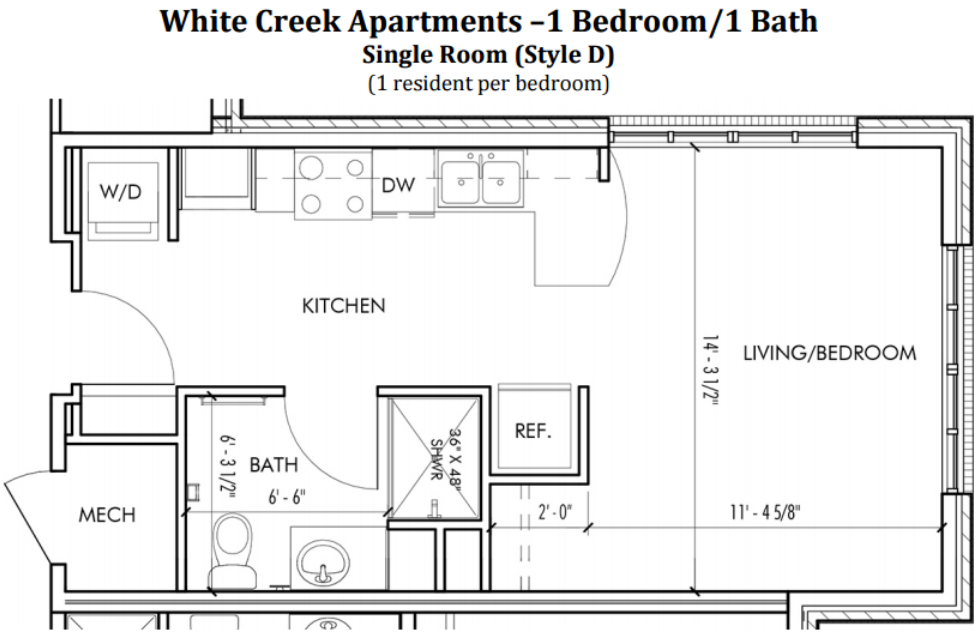



*Figure 13.* Layout of Single Bedroom with Bathroom, from Department of Residence Life (2016)

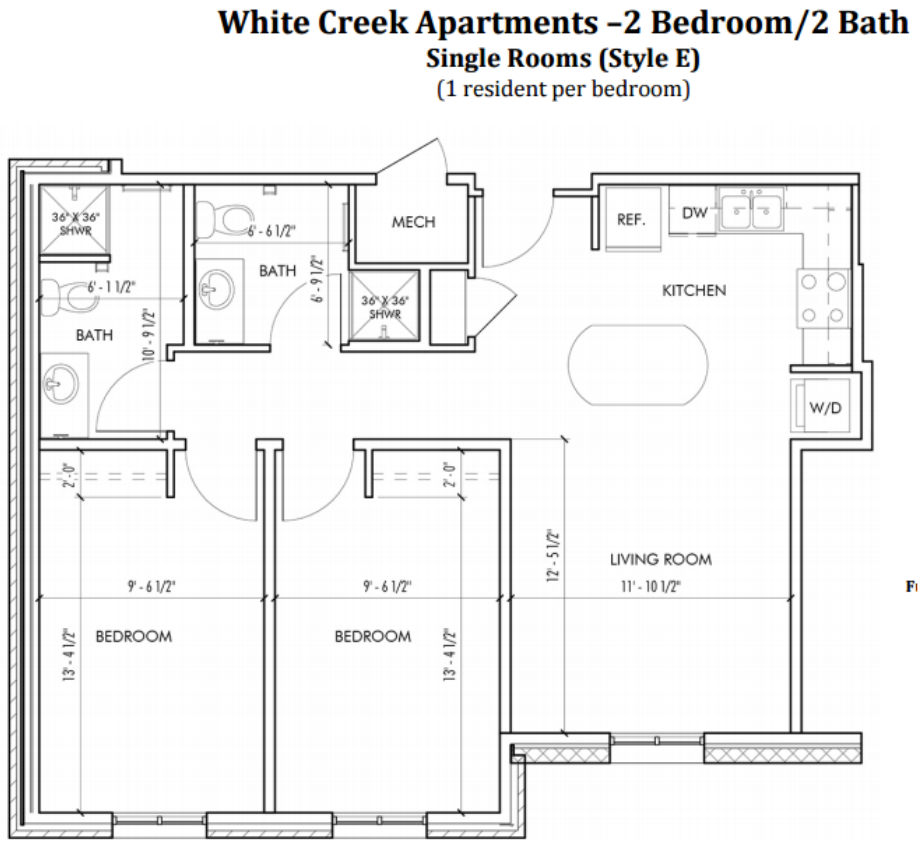



*Figure 14.* Layout of Two-bedroom with Two-bathroom, from Department of Residence Life (2016)

White Creek Apartments is pretty similar to other fully-furnished off-campus housing. It provides a great location with excellent on-campus bus transportation service. Apart from having few floor plans that provide individual bedrooms and private bathrooms, it is a standard apartment.

## CURRENT STATUS OF WHITE CREEK APARTMENTS

Figure 15 (Transportation Services at Texas A&M University, 2016) shows that TAMU offers one daytime and two night-weekend on-campus routes for tenants to commute between the apartment and the bus terminal which is located at the Texas A&M Memorial Student Center. There are also further public facilities, such as White Creek Community Center, undergoing construction that will be able to open and start to provide service in spring, 2018.

Students living here mostly drive to the markets and all kinds of stores for at least several miles to get what they need. Because the apartment is nearby to University Drive, one of the major boulevards in College Station, they can get on the road anytime without waiting. However, if the students do not have a car or prefer to use public transportation, it would not be very pleasant. Students need to wait for an on-campus bus to the bus terminal then transfer to an off-campus bus. Usually these buses are overcrowded during the daytime, while the schedule would be reduced or even canceled at night or during weekends and holidays. Therefore, it is unusual to see the students living in White Creek Apartments carrying a lot of shopping bags along the roads.

There is a great advantage for students who live in White Creek Apartments: namely, the on-campus bus routes are usually intensively scheduled, and unlike off-campus buses, do not skip bus stops. Hence, students do not need to worry that they would miss the first class at 8 am because a fully-loaded bus failed to stop. By contrast, the students living off-campus frequently encounter this situation, especially those

whose apartments are located at the last bus stop before school; the worst situation is that they cannot get on any bus between the first-bound bus and their first class.

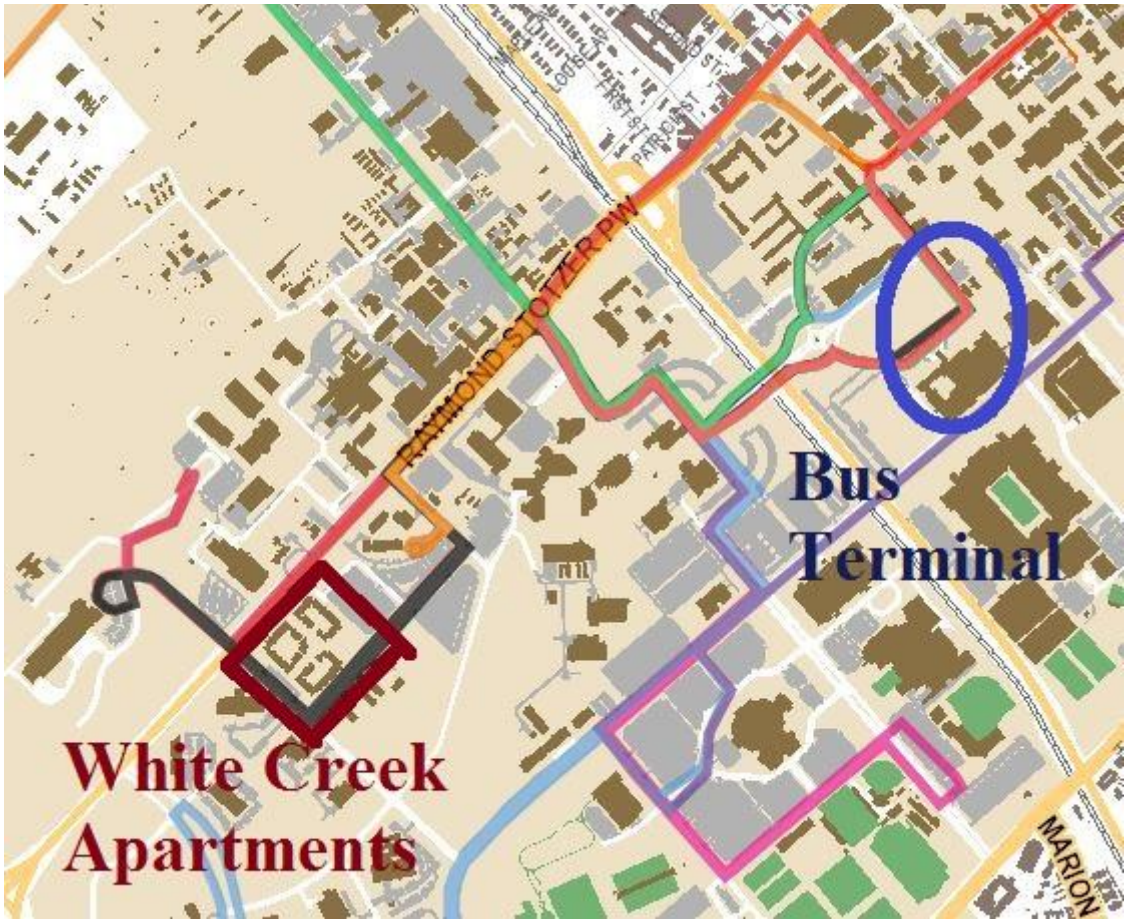
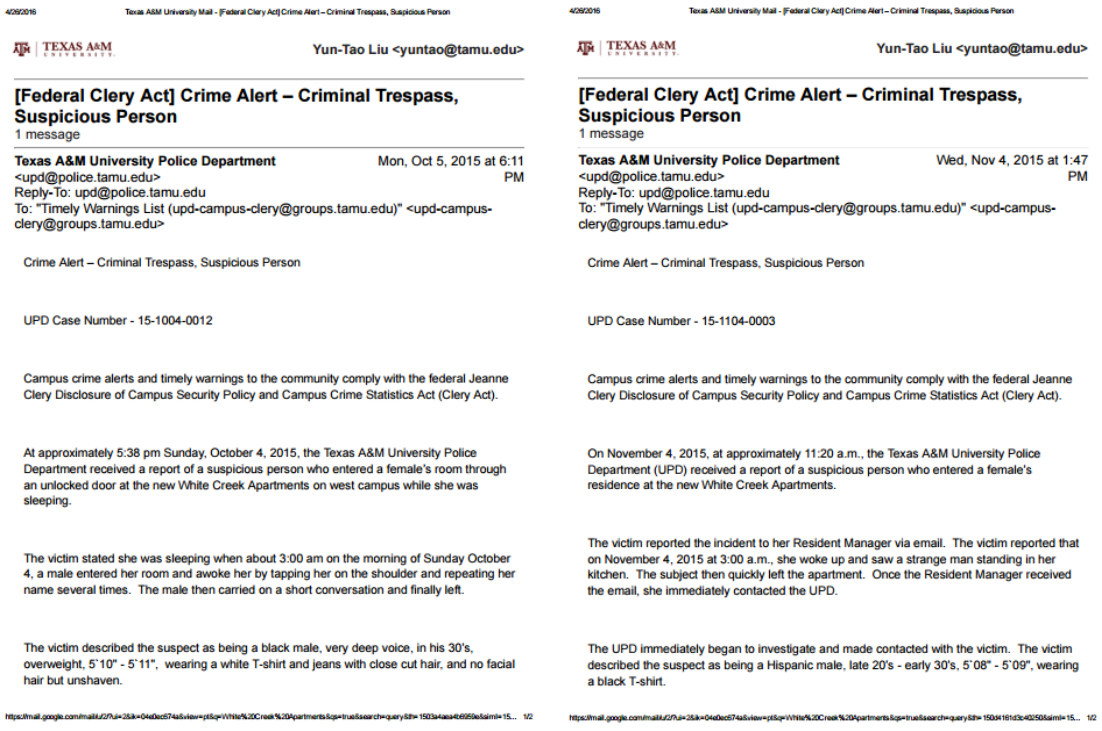



*Figure 15.* On-campus Bus Routes, from Transportation Services at Texas A&M University (2016)

However, despite the convenience of transportation, there are several apparent safety issues. Figure 16 shows that on more than one occasion since its opening in September, 2015, criminal incidents were reported at the White Creek Apartments. These cast a pall on the brand-new student housing.



4/26/2016 Texas A&M University Mail - [Federal Clery Act] Crime Alert – Criminal Trespass, Suspicious Person

TEXAS A&M UNIVERSITY

Yun-Tao Liu <yuntao@tamu.edu>

**[Federal Clery Act] Crime Alert – Criminal Trespass, Suspicious Person**

1 message

**Texas A&M University Police Department** <upd@police.tamu.edu> Mon, Oct 5, 2015 at 6:11 PM
Reply-To: upd@police.tamu.edu
To: "Timely Warnings List (upd-campus-clery@groups.tamu.edu)" <upd-campus-clery@groups.tamu.edu>

Crime Alert – Criminal Trespass, Suspicious Person

UPD Case Number - 15-1004-0012

Campus crime alerts and timely warnings to the community comply with the federal Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act (Clery Act).

At approximately 5:38 pm Sunday, October 4, 2015, the Texas A&M University Police Department received a report of a suspicious person who entered a female's room through an unlocked door at the new White Creek Apartments on west campus while she was sleeping.

The victim stated she was sleeping when about 3:00 am on the morning of Sunday October 4, a male entered her room and awoke her by tapping her on the shoulder and repeating her name several times. The male then carried on a short conversation and finally left.

The victim described the suspect as being a black male, very deep voice, in his 30's, overweight, 5`10" - 5`11", wearing a white T-shirt and jeans with close cut hair, and no facial hair but unshaven.

https://mail.google.com/mail/u/0/?ui=2&ik=04e0ec674a&view=pt&q=White%20Creek%20Apartments&qs=true&search=query&th=1503a4aea4b6959e&siml=15... 1/2

4/26/2016 Texas A&M University Mail - [Federal Clery Act] Crime Alert – Criminal Trespass, Suspicious Person

TEXAS A&M UNIVERSITY

Yun-Tao Liu <yuntao@tamu.edu>

**[Federal Clery Act] Crime Alert – Criminal Trespass, Suspicious Person**

1 message

**Texas A&M University Police Department** <upd@police.tamu.edu> Wed, Nov 4, 2015 at 1:47 PM
Reply-To: upd@police.tamu.edu
To: "Timely Warnings List (upd-campus-clery@groups.tamu.edu)" <upd-campus-clery@groups.tamu.edu>

Crime Alert – Criminal Trespass, Suspicious Person

UPD Case Number - 15-1104-0003

Campus crime alerts and timely warnings to the community comply with the federal Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act (Clery Act).

On November 4, 2015, at approximately 11:20 a.m., the Texas A&M University Police Department (UPD) received a report of a suspicious person who entered a female's residence at the new White Creek Apartments.

The victim reported the incident to her Resident Manager via email. The victim reported that on November 4, 2015 at 3:00 a.m., she woke up and saw a strange man standing in her kitchen. The subject then quickly left the apartment. Once the Resident Manager received the email, she immediately contacted the UPD.

The UPD immediately began to investigate and made contacted with the victim. The victim described the suspect as being a Hispanic male, late 20's - early 30's, 5`08" - 5`09", wearing a black T-shirt.

https://mail.google.com/mail/u/0/?ui=2&ik=04e0ec674a&view=pt&q=White%20Creek%20Apartments&qs=true&search=query&th=150d4161d3c40250&siml=15... 1/2

*Figure 16.* Crime Alert, Email from Texas A&M University Police Department (2016)

## BACKGROUND OF PRINCE HOUSE

On February 9, 2000, Taiwan Government enacted a new special law, Act for Promotion of Private Participation in Infrastructure Projects (PPPIP Act), to encourage all government systems and its affiliates to adopt PPP projects (Ministry of Justice,

2000). This special act supersedes the Government Procurement Act and other public-funding related regulations. The point of the higher status of the PPPIP Act is to eliminate the conservative attitude which was created by the traditional government procurement methods, and give more flexible authority to the civil servants to receive ideas from private companies.

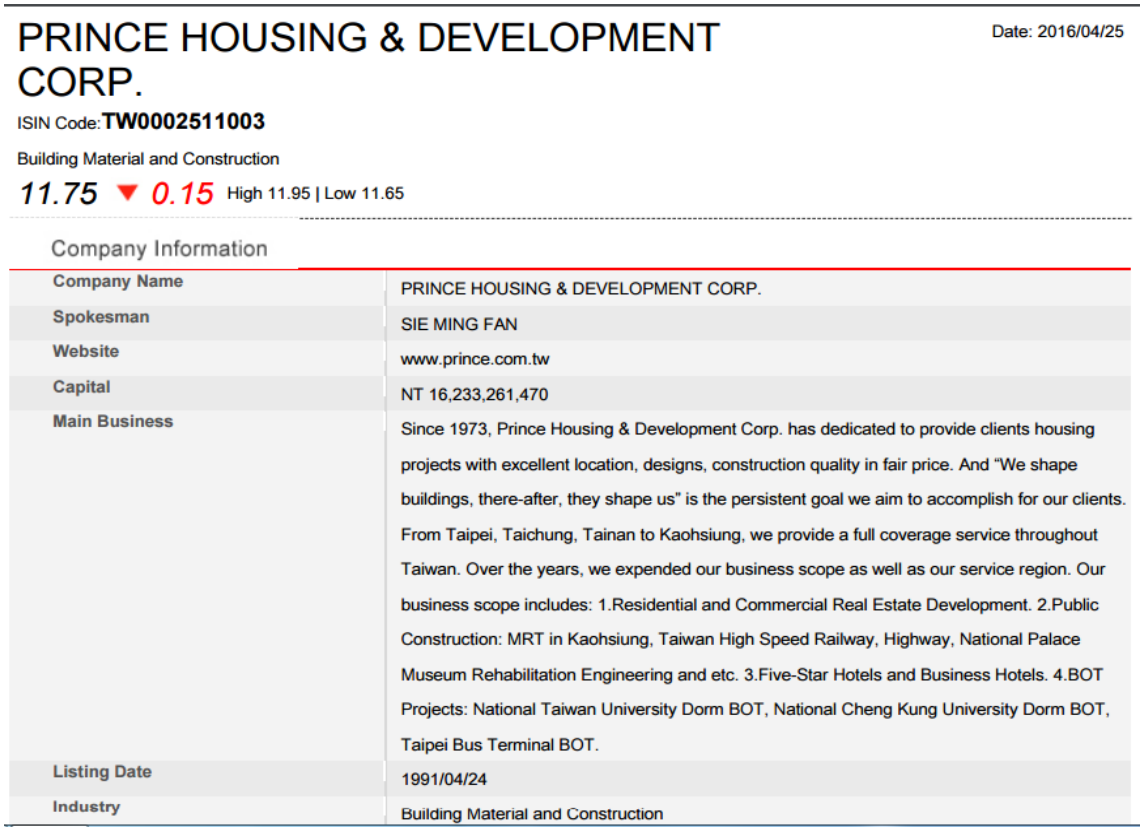
Besides the benefits of flexible delivery methods, PPP projects can also circumvent the Agreement on Government Procurement of the World Trade Organization, which places restrictions on traditional government procurement. Since with most PPP projects, such as Build-Operate-Transfer, Rehabilitate-Operate-Transfer, or Build-Transfer-Operate, the government does not provide the funding or financial support, these are excluded from the definition of 'Government Procurement'.

Due to the growing numbers of public universities and limited tax collection, all higher education institutions in Taiwan are confronted with budget shortages, while the operation and personnel cost continue to rise every year. Universities choose to invest in renewing experimental facilities and faculty wages rather than in student service; for example, in dormitory renovation and construction. The results are an increase in the number of students living outside campus.

To provide better and more residential housing service, several public universities in Taiwan began to consider seeking private finance. At the beginning, most university administration departments resisted complying with the PPIP Act because of the complicated relationships entailed and legal terms written in the contract. However, due to the critical financial situation, some universities decided to enter into PPP projects

with the assistance of the Department for the Promotion of Private Participation Ministry of Finance.

In accordance with the PPIP Act, National Taiwan University signed the BOT (PPP) contract with Prince Housing & Development Corp., a publicly-traded company, on March 17, 2005 (Ministry of Finance, 2005), refer to Figure 17. The contract is for developing the first university PPP student housing, Prince House, which includes two sites, Chang-Hsing Dormitory and Shui-Yuan Dormitory.



PRINCE HOUSING & DEVELOPMENT CORP.

Date: 2016/04/25

ISIN Code:**TW0002511003**

Building Material and Construction

*11.75* ▼ *0.15* High 11.95 | Low 11.65

Company Information

| | |
|---|---|
| **Company Name** | PRINCE HOUSING & DEVELOPMENT CORP. |
| **Spokesman** | SIE MING FAN |
| **Website** | www.prince.com.tw |
| **Capital** | NT 16,233,261,470 |
| **Main Business** | Since 1973, Prince Housing & Development Corp. has dedicated to provide clients housing projects with excellent location, designs, construction quality in fair price. And "We shape buildings, there-after, they shape us" is the persistent goal we aim to accomplish for our clients. From Taipei, Taichung, Tainan to Kaohsiung, we provide a full coverage service throughout Taiwan. Over the years, we expended our business scope as well as our service region. Our business scope includes: 1.Residential and Commercial Real Estate Development. 2.Public Construction: MRT in Kaohsiung, Taiwan High Speed Railway, Highway, National Palace Museum Rehabilitation Engineering and etc. 3.Five-Star Hotels and Business Hotels. 4.BOT Projects: National Taiwan University Dorm BOT, National Cheng Kung University Dorm BOT, Taipei Bus Terminal BOT. |
| **Listing Date** | 1991/04/24 |
| **Industry** | Building Material and Construction |

*Figure 17.* Information for Prince Housing & Development Corp., from Taiwan Stock Exchange Corporation (2016)

Besides the student housing, Prince Corp. also constructed a hotel and an outlet mall alongside the Shui-Yuan Dormitory to gain revenue for offsetting the construction costs. National Taiwan University retains the rights to intervene in student housing rates, but the charges of hotel and rents of outlet mall are both excluded.

Figure 18 shows the Prince House (Shui-Yuan Dormitory). It sits within the original site of the Army Medical College, before it was relocated to the National Defense Medical Center. Chang-Hsing Dormitory is located at the east side of the university (75, Secrion 3, Keelung Road, Da-An District, Taipei City, 10672), and Shui-Yuan Dormitory is located at 16-2(Building A),16-3(Building B),16-5(Building C), Si-Yuan Street, Zhong-Zheng District, Taipei City ,10087.

Figures 19 and 20 present the environment of Chang-Hsing Dormitory. As Figures 21 and 22 show, besides a convenience store, Shui-Yuan Dormitory also has a coffee shop, restaurants, and a mall.

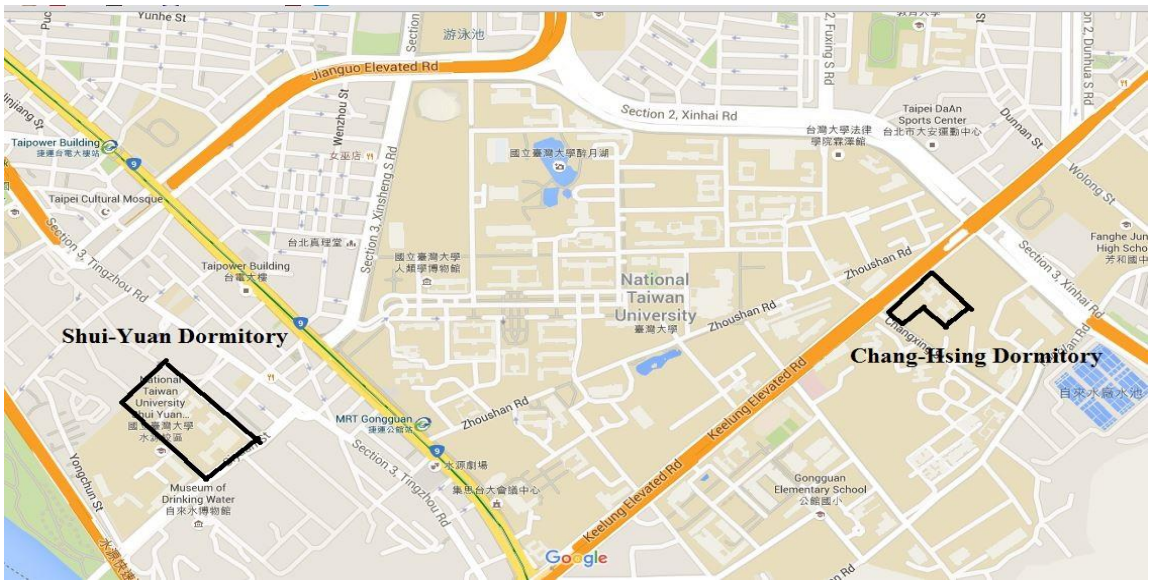



*Figure 18.* Relative Locations of Shui-Yuan Dormitory and Chang-Hsing Dormitory, from Google Maps (2016)

*Figure 19.* Vital Functions of Chang-Hsing Dormitory 1

*Figure 20.* Vital Functions of Chang-Hsing Dormitory 2


*Figure 21.* Vital Functions of Shui-Yuan Dormitory 1


*Figure 22.* Vital Functions of Shui-Yuan Dormitory 2

*Figure 23.* Environment of Shui-Yuan Dormitory

DESIGN OF PRINCE HOUSE

Figure 24 shows that Chang-Hsing Dormitory is a two-building residential area (Prince Housing & Developiment Corp., 2008), which has 747 bedrooms with 1,145 beds, including single rooms, twin rooms, and triple rooms.

Figures 23, 25, and 26 shows that Shui-Yuan Dormitory is a four-building residential area (Prince Housing & Developiment Corp., 2008). There are three student housing buildings which comprise 1,841 rooms with 2362 beds, including single rooms, twin rooms, triple rooms, and Shui-Yuan Suites (Five Rooms).

The fourth building on Shui-Yuan Campus contains Hsiu-Chi House, which is a business hotel, and Uni Plaza, which has an outlet mall with several restaurants.

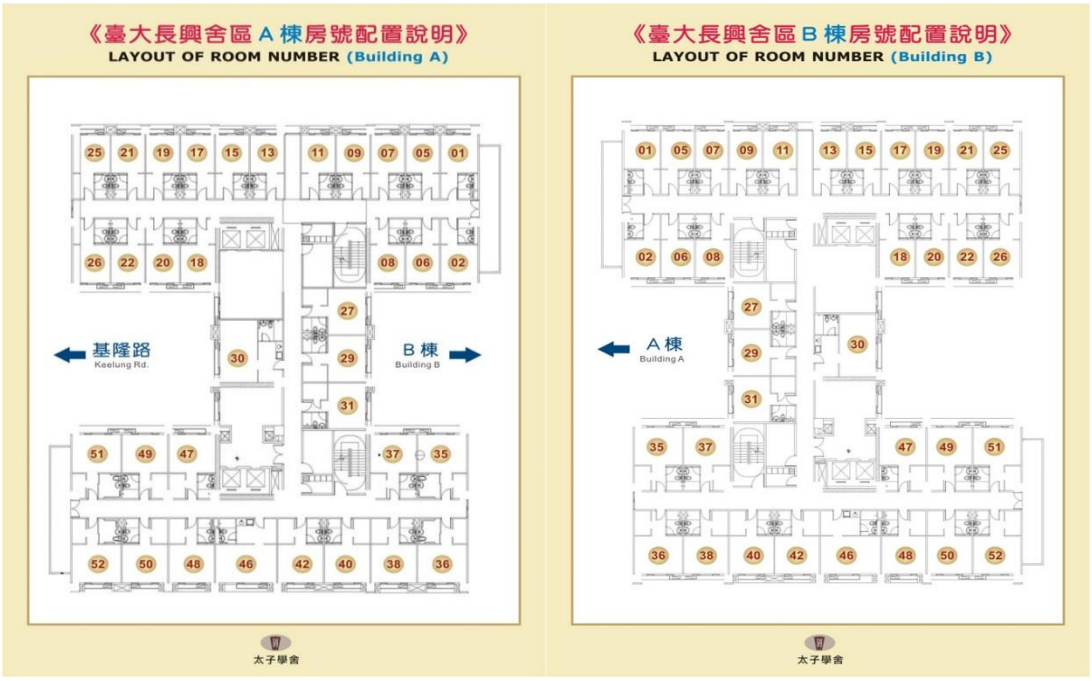



*Figure 24.* Layout of Chang-Hsing Dormitory, from Prince Corp. (2008)


*Figure 25.* Layout of Shui-Yuan Dormitory Building A/B, form Prince Corp. (2008)


*Figure 26.* Layout of Shui-Yuan Dormitory Building C and Hsiu-Chi House, from Prince Corp. (2008)

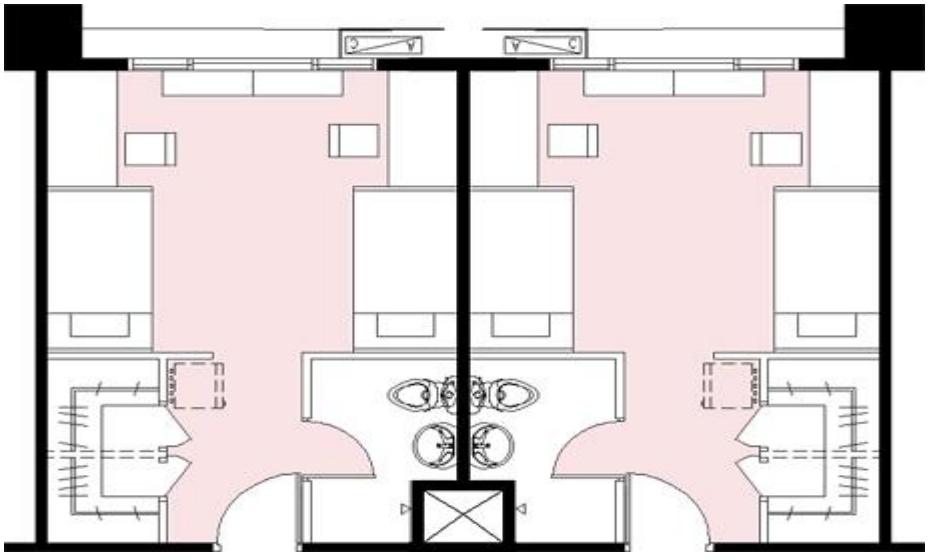


*Figure 27.* Room Layout of Twin Room, from Michiyo (2008)

Table 4

*Facilities and Amenities of Single Room*

| Single Room | |
|---|---|
| Independent Bathroom | Built-in wardrobes |
| Bed Frame (mattress not included) | Shoe Cabinet |
| Book shelves | Refrigerator (small, single door, 9L) |
| Desk and Chair | Air conditioner |
| Electric water heater | Inter-campus telephone |
| NTU Academic Network | |

Table 5

*Facilities and Amenities of Twin Room and Triple Room*

| Twin Room, and Triple Room | |
|---|---|
| Shared Bathroom | Built-in wardrobes |
| Bed Frame (mattress not included) | Shoe Cabinet |
| Book shelves | Refrigerator (small, single door, 9L) |
| Desk and Chair | Air conditioner |
| Electric water heater | Inter-campus telephone |
| NTU Academic Network | |

Table 6

*Facilities and Amenities of Shui-Yuan Suite*

| Shui-Yuan Suite (Five Rooms) | |
|---|---|
| Recreation hall | Kitchen |
| Independent Bathroom | Built-in wardrobes |
| Bed Frame (mattress not included) | Shoe Cabinet |
| Book shelves | Refrigerator |
| Desk and Chair | Air conditioner |
| Electric water heater | Inter-campus telephone |
| Communal Area (including simple equipped kitchen, dining table) | NTU Academic Network |

## CURRENT STATUS OF PRINCE HOUSE

National Taiwan University is located in an early development area due to the opening of Gong-Guan Purification Plant (Taipei Water Department, 2015), the first drinking water treatment facility in Taipei (Wikipedia, 2016).

During the colonial period of Japan, the Japanese established one of the first higher education institutions in the southern Taipei area and named it as Taihoku (Taipei) Imperial University, the predecessor of National Taiwan University (National Taiwan University, 2015). The presence of numerous wealthy students promoted the initiation of commercial activities.


*Figure 28.* Gong-Guan Area (Shui-Yuan Market), from Department of Cultural Affairs (2011)

*Figure 29.* Gong-Guan Area (Treasure Hill Village), form Department of Cultural Affairs (2010)

*Figure 30.* Gong-Guan Area 3 (Shopping Area), from 郭逸 (Yi Guo) (2015)


*Figure 31.* Gong-Guan Area 4 (Restaurants), from 黃世宏 (Shi-Hong Huang) (2014)

Now the Gong-Guan Commercial Area has become one of the major shopping districts in Taiwan, shown in Figures 30 and 31, it includes dining and historical areas. It also provides all kinds of service and vital functions for college students and the neighborhood, including Shui-Yuan Market (Figure 28) (Department of Cultural Affairs, 2011) and Gong-Guan Shopping Area.

There are a lot of historical spots and art establishments in this area, such as Treasure Hill (Figure 29) (Department of Cultural Affairs, 2010), Yi-Fang Old House, Taipei City Hakka Cultural Park and Witch house , besides the Gong-Guan Purification Plant,. Therefore, students prefer to live in on-campus dormitories, because it is more convenient for school, dining, and shopping than living off-campus.

## METHOD

A standard financial analysis will be completed for the two projects.

# CHAPTER IV

# RESULTS

## INTRODUCTION

This chapter summarizes the results for the financial analysis. The results include comments on the differences and similarities, but does not discuss the dormitories' advantages or shortcomings. In the methodology section, based on the information collected from official open resources, the preference of students in two different countries can be identified for TAMU and Taiwan.

Of course, since the population of tenants is over one thousand, it is impossible to be sure that all students have the same preferences. This chapter combines these hypothetical variations of economic condition into categories, and presents the results for the economic analysis.

This chapter outlines the differences, similarities and the rent issues.

## DIFFERENCE BETWEEN TWO DORMITORY PROJECTS

The first point of comparison is the differences in the two projects, followed by the similarities, a discussion on the rents and provides a summary. The financial feasibility is outlined in chapter V.

Tables 7, 8, and 9 present some differences that are selected from Chapter III, which are divided into three categories: room facilities, equipment, and service; public facilities, equipment, and service; and contract.

Table 7

*Difference of Room Facilities, Equipment, and Service*

| Room Facilities, Equipment, and Service | TAMU | NTU |
|---|---|---|
| Room Size (Single Room) | 437 (Sq. Ft.) | 197~218 (Sq. Ft.) |
| Individual Bedroom | All individual bedrooms | Twin room and triple room are not |
| Campus Internet | Free | Charged |
| Mattresses | Provided | Optional (for a fee) |
| Kitchen | Stove, Dish Washer, and Microwave Oven | No Kitchen |
| Individual Washer/Dryer | Provided | Not Provided |
| Furniture | Fully furnished | Half furnished |
| Cable | Provided | Optional (Extra charges) |
| Wireless Internet | Provided | Not Provided |
| Ceiling Fan | Provided | Not Provided |
| Air Conditioning | Cool and heat | Cool only |
| Electricity Charge | Including the next month bill | Prepaid Card, Running out of reloads would lose the electricity supplies |

Table 8

*Difference of Public Facilities, Equipment and Service*

| Public Facilities, Equipment and Service | TAMU | NTU |
|---|---|---|
| Parking | Parking lot | Underground Garage |
| Restaurant | None | Opened |
| Convenience store | None | Opened |
| Recycle Enforcement | None | Enforced |
| Staff | Live-in professional and student | Prince House Employees |
| Maintenance | 24-hour on-call | Online schedule |
| Locked Mailbox | Provided | Not Provided |
| Outdoor Space | Courtyard with BBQ grills | Courtyard (Shui-Yuan Dormitory only) |

Some contrasts result from differences in the academic system or from business considerations. For example, there is no summer semester in Taiwan, but instead, a two-month summer vacation. Thus, spring and fall semesters of National Taiwan University, each about five months, are both longer than Texas A&M University's, which are about four months. Therefore, the PPP dormitory operators would suffer a loss if the dormitories are vacant during the summer vacation.

Table 9

*Difference of Contract*

| Contract | TAMU | NTU |
|---|---|---|
| Contract Term | Nine and half months or annual | Only annual |
| Leaser | Texas A&M University | Prince Housing & Development Corp. |
| Payment Method | Per semester | Per month |
| Room number assigned | Continuous | All the number ended with four or read with ominous are skipped |

The lessor usually tends to offer an annual leasing contract term in order to cover the visible loss during summer vacation and winter break. On the other hand, the students have to pay for the period, which they did not need to pay for in the past because the university administration did not allow them to occupy the dormitories after the final examinations. However, White Creek Apartments allows residents to sign a contract for nine and a half months only, i.e. for the fall and spring semesters.

There are several other differences, which are products of the culture, especially room number assignment. In (Chinese) Mandarin, "number four" is pronounced similarly to "die," and hence, people may believe that living in room number four or on

the fourth floor would cause illness or even death. Therefore, all the hospitals in Taiwan are lacking the fourth floor. In several welfare facilities or hotels where the tenants or visitors might feel sensitive to the issue of life and death, the fourth floor is skipped. Sometimes the fourteenth and other floors that end with the digit four is skipped as well. Although most college students are not so superstitious with this belief, their parents, who pay the rent, might believe in it. In Texas A&M University, the room numbers are continuous without skipping in general.

Moreover, college students in Taiwan like to spread urban legends which usually involve stories about the students who died in the dormitory, and whether the stories are true or not, these stories usually cause the rooms in the urban legends to be avoided by the incoming students, especially those rooms whose numbers end with four.

## SIMILARITIES OF TWO DORMITORY PROJECTS

Similarities have been selected and listed in the same way as the differences. Not all of the equipment or facilities would be listed if they are common. However, if any feature is specifically listed on the website of White Creek Apartments or Prince House, it would be put into the lists and compared to the other dormitory.

Tables 10, 11, and 12, some similarities that might draw the attention of potential occupants. The two places are different due to the different cultures, different ethnicities, different customs, or different weather. The reason for the similar amenities, however, might be the availability of information about “comparable” residential complexes through the Internet.

Table 10

*Similarities of Room Facilities, Equipment, and Service*

| | TAMU | NTU |
|---|---|---|
| Extra Utility Fee | Electricity | Electricity |
| Utility Fee (Exclude Electricity) | All included in rent | All included in rent |
| Campus Internet | Free (with Net ID) | Free (applied access from university) |
| Wired Internet | Provided | Provided |
| Table/ Chair | Provided | Provided |
| Bed | Provided | Provided |
| Closet | Provided | Provided |

Table 11

*Similarities of Public Facilities, Equipment and Service*

| | TAMU | NTU |
|---|---|---|
| Community Center | Opens in 2018 | On first floor |
| Activity Center | Provided | Provided |

Table 12

*Similarities of Contract*

| | TAMU | NTU |
|---|---|---|
| Lessee | Individuals | Individuals |
| Pets | Not allowed | Not allowed |
| Smoking | Not allowed | Not allowed |
| Roommate | Same gender | Same gender |

Oriental students usually prefer to use a natural gas stove to cook due to the higher cooking temperature. Nevertheless, after moving to the dormitories, due to the limitation of the space and public safety concerns, use of natural gas or portable butane gas stoves is not allowed indoors at any time. Therefore, the microwave oven became an alternative and safer option. On the other side of the earth, the students here in Texas do not use natural gas to cook because of a lack of popularity of natural gas or liquefied gas in large territories; on the other hand, they usually use the electric oven, stove, or microwave to prepare meals.

The most common indoor amenity is the power sockets. Due to the popularity of computers and mobile phones, new dormitories contain as many sockets as possible. By comparison, in the older dormitories in Taiwan, each student might only get one or two sockets. This also leads to another issue; namely, the electrical expense. During the past, because the electrical equipment and devices were both expensive and physically large,

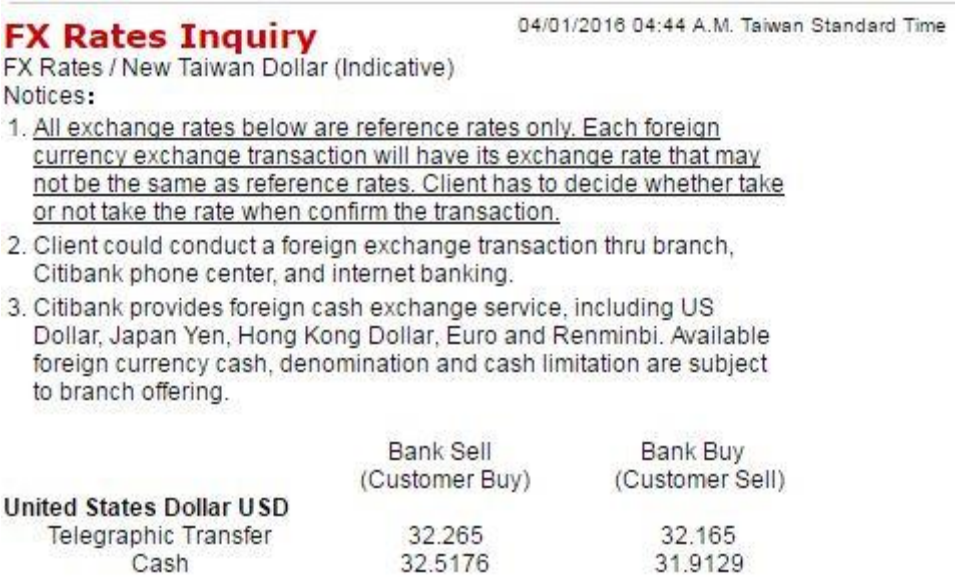
the students could hardly purchase and place them in the dormitories. However, as a result of technological innovation, most students might now own at least one lamp, one mobile phone, one tablet, and one laptop computer. Some might also have a desktop computer, stereo set, electronic musical instrument, television, Christmas lights, or even fitness equipment, and these all might cause the electricity usage to increase rapidly.

RENTS

To measure foreign exchange rates, this research adopts central parity rate (CPR), which is calculated by the formula (Bank Sell + Bank Buy)/2. The foreign currency data was obtained from Citibank (Taiwan) Inc. on April 1st, 2016 (Citibank (Taiwan) Inc., 2016). According to the Figure 32, the exchange rate between the United States Dollar (USD) and New Taiwan Dollar (NTD) is 32.215 [(32.265+32.165)/2].

After the currency exchange as shown in Table 13, a student who lives in a single room, twin room, triple room, or Shui-Yuan Suites needs to pay $229, $152, $136, or $273 per month in United States Dollars, respectively.

The significance of the rent price chart is that each student who lives in Shui-Yuan Suites has to pay more than those living in other kinds of rooms. The reason is that each bedroom in Shui-Yuan Suites is bigger even than the single room and has its individual bathroom, and the living room is not calculated into this cost.



**FX Rates Inquiry**

04/01/2016 04:44 A.M. Taiwan Standard Time

FX Rates / New Taiwan Dollar (Indicative)

Notices:

1. All exchange rates below are reference rates only. Each foreign currency exchange transaction will have its exchange rate that may not be the same as reference rates. Client has to decide whether take or not take the rate when confirm the transaction.
2. Client could conduct a foreign exchange transaction thru branch, Citibank phone center, and internet banking.
3. Citibank provides foreign cash exchange service, including US Dollar, Japan Yen, Hong Kong Dollar, Euro and Renminbi. Available foreign currency cash, denomination and cash limitation are subject to branch offering.

| | Bank Sell (Customer Buy) | Bank Buy (Customer Sell) |
|---|---|---|
| **United States Dollar USD** | | |
| Telegraphic Transfer | 32.265 | 32.165 |
| Cash | 32.5176 | 31.9129 |

*Figure 32.* Exchange Rates, from Citibank (Taiwan) Inc.

Although the rent price chart of Prince House looks much cheaper than White Creek Apartments, there are many differences that should be discussed, such as room size, furniture, service, etc. These will be presented in the next chapter.

Table 13

*Annual Rates of Prince House*

| Room Type | Rent in New Taiwan Dollar | Rent in U.S. Dollar |
|---|---|---|
| Single Room | NTD: 7,400 | USD: 229 |
| Twin Room | NTD: 4,900 | USD: 152 |
| Triple Room | NTD: 4,400 | USD: 136 |
| Shui Yuan Suite | NTD: 8,800 | USD: 273 |

LEVELING RENTS

The rents of the two dormitories seem much different, and White Creek Apartments looks obviously much more expensive than Prince House does. However, the two cities have different Average Income Index and Consumer Price Index, and it would be inaccurate to compare the numbers without any leveling adjustments of the economic situations and disposable income.

In this research, the Big Mac Index is adopted to help level the different economic conditions that would make the rent comparison invalid if only foreign currency exchange rates had been considered.

From Figure 33, a Big Mac in Taipei is NTD $69, and it is USD $4.21 in College Station as shown on Figure 34. As shown in Figure 32, the currency rate ratio is NTD:

USD=32.215:1, and therefore, a Big Mac in Taiwan is USD \$2.1419 $\left(\frac{69}{32.215} = 2.1419\right)$, so the Big Mac index of Taipei and College Station is 0.5 $\left(\frac{2.1419}{4.21} = 0.5\right)$.


*Figure 33.* Retail Price Chart of McDonalds in Taiwan, form 朱正庭 (Zheng-Ting Zhu) (2016)

After converting the original rent price of Prince House from New Taiwan Dollar into United States Dollar, we then multiply the rents of Prince House by 1.5 $(1 + 0.5)$. The result from Figure 14 shows that the rents of Prince House would then range from USD\$272 to USD\$546.

However, it is not practical to compare the rents between White Creek Apartments and Prince House, because there is no such kind of room where more than one person lives in one bedroom at White Creek Apartments. Therefore, only the single room should be brought into comparison.


*Figure 34.* Retail Price of Big Mac in College Station, Texas

A single room is 437 $ft^2$ and $1,034 per month at White Creek Apartments and 197 to 218 $ft^2$ and $458 per month at Prince House. Table 15 shows a calculation of the unit price of a single room; White Creek Apartments would be $2.36 per square foot, and Prince House would be $2.1 to $2.32 per square foot. It is obvious that the rent prices for a single room whether at White Creek Apartments or Prince House are similar after leveling the economic situations and disposable income at different cities.

Therefore, it is objective to compare two dormitories; the research outcome is not considered to be affected by the difference of locations.

Table 14

*Rent Price Chart of Prince House before and after Adjustment*

| Room Type | Rent in New Taiwan Dollar | Rent in U.S. Dollar | Rent in U.S. Dollar by Big Mac Index |
|---|---|---|---|
| Single Room | NTD$7,400 | USD$229 | USD$458 |
| Twin Room | NTD$4,900 | USD$152 | USD$304 |
| Triple Room | NTD$4,400 | USD$136 | USD$272 |
| Shui Yuan Suite | NTD$8,800 | USD$273 | USD$546 |

It should be noted that if there was a difference in rental rates per square foot, then this would provide an incentive for investment, which tends to reduce the differential. One concludes that the two systems are more linked economically than most people would believe.

Table 15

*Per Square Feet Rents of Single Bedroom with Bathroom (in U.S. Dollar)*

| | Before Adjustment | After Adjustment |
|---|---|---|
| Prince House | 1.05~1.16 | 2.1~2.32 |
| White Creek Apartments | 2.36 | 2.36 |

## SUMMARY

Most differences and similarities in Chapter V are listed based on the official floor layout and promised facilities; the individual furnishing of the bedrooms is not taken into consideration.

Almost every phenomenon has sufficient explanations and practicable solutions; for example, contract length is related to the academic system, room number assignment is affected by the local customs, the choice of the microwave oven as the major appliance is made for several different reasons, and demand for power sockets is increasing in both dormitories. Taking the cultures, customs, and ethnicities into account for research and discussion, it is possible to identify the root-cause relationships of differences and similarities.

# CHAPTER V

# FINANCIAL FEASIBILITY

## INTRODUCTION

In this chapter, a basic financial feasibility evaluation is conducted and the results are shown and discussed between the two projects.

The material in this chapter should enable a project planners executives immediately evaluate whether a project is viable. If the project is unable to pass a basic evaluation, there is no need to spend further effort and budget to conduct a further detailed evaluation of its financial feasibility.

## SIGNIFICANCE OF PPP FINANCIAL FEASIBILITY

Student on-campus housing differs from the privately-owned residential housing, hotel, or commercial housing. One of the significant factors of the PPP projects is ownership of the properties. The investor does not need to buy properties, and universities retain ownership before and after the contract. During the contract period, the University might receive the property rents from the contractor. In some cases, the university might request an entitlement premium or royalty. In Taiwan, the PPPIP Act excludes all the rights of private sectors to purchase the public properties during the contract period.

Another significance of these two PPP dormitory projects is the distribution of resources. Belfour Betty Campus Solutions and Prince Corp. both have more than one PPP dormitory project, and this advantage makes them able to gain experience faster

than their competitors. They are able to send experimental staff to a new project, and they can design a popular dormitory with great profits in a short time as well.

What they cannot control is the local market, major construction in the region at the time of construction may affect prices of construction. We assume normal conditions.

## INDICATORS OF FINANCIAL FEASIBILITY

This research takes construction cost, property rent, residence rentals, and interest cost as the four major indicators for the cost estimation. The other financial issues have minor financial impact compared to these four. Therefore, this research leaves them for future researchers.

This chapter makes an estimation of financial feasibility for each project under different hypothetical conditions. Economic situation change all the time, this research will apply different interest rates and different repayment periods in accordance with accepted practice.

Table 16 shows the indicators used in the following evaluations.

This research evaluates a project's financial feasibility by its projected net profit. The basic idea is to calculate the net profit by deducting the cost from revenue. Although there are numerous revenue and cost items, the calculation only considers major impact factors. Making rough calculations could reveal the big picture, and in this sense, could be more representative and accessible. Net profit presents the actual cash flow into the contractor's account. Revenue includes all value added and pledged to be added to the company. This includes transfer of land, patents, and goods, evaluated in terms of

money, and can also include cash, checks for a later date, etc. It is emphasized that revenue does not mean cash, and involves non-liquidity and a risk of a contractors inability to turn the profits into cash. Usually, a conservative attitude is taken when estimating net profit. In this research, minimum of net profit is always expected, and extra income from charging service or stores is not considered.

We group different factors contributing to a project's balance sheet into two groups, major factors and minor factors. Major factors include the cost of rent, construction cost, or loans, and minor factors include advertising, gardening, or document printing. The major factors cost orders of magnitude more than the minor factors. Most PPP projects include construction cost, maintenance, and operation cost into whole project period investment cost, and therefore, the researcher does not need to calculate the amount of these costs separately in conducting the financial feasibility.

One different financial factor between White Creek Apartments and Prince House is the funding method. Prince Crop. planned to pay by cash (equity) and bank loan, and on the other hand, Belfour Betty Campus Solutions chose to pay by raising bonds (explained below). Prince Crop. had to invest partly its own equity due to the requirements from contract and to PPPIP. The reason why a contractor is asked to spend its private equity for the PPP projects is that in the past, some contractors bid for PPP projects with entirely bank finance, rather than investing its own money. The issue is that in some PPP projects in which no private equity was invested, upon running over budget, the contractors left the contract with no loss, leaving unfinished construction for the government and large debt for the bank. After several failed PPP projects, the

government started to request the contractor invest its own money (equity). Therefore, NTU (National Taiwan University) conducted the contract with the requirement that invested equity be no less than 30% of the construction cost, in order to ensure the contractor who would not leave the contract on a whim. This research considers the equity investing in Prince House as the down payment, because the equity is from the company's stockholders who invest in the company without asking for interest, although they do expect a return on the investment in line with the likely risk to the money. The bank loan which Prince Corp. acquired is from a consortium group with seven banks which is lead by Mega International Commercial Bank. The loan contract was designed with annual payment before the end of the Prince House PPP contract; however, Prince Crop. holds the rights to pay earlier than the loan contract allows. Earlier payment decreases the interest cost.

Belfour Betty Campus Solutions is a subsidiary of the Belfour Betty Group, and it decided to issue tax-exempt bonds to cover the construction cost. The advantage of borrowing money by issuing bonds is that the interest cost is fixed and predictable. Especially to a non-publicly-traded company, issuing bonds to its parent company or sister company can avoid the risk of outside debtors interrupting the operation and also of revealing financial situation. The other advantage is that most bond issuers only need to pay interest during the loan contract period, and pay the original full face value amount (borrowed amount) when the bonds mature (the last paying date). For sizable investment or high-risk projects, the issuing of bonds can ease the financial burdens during the first several years of the contract period. If the contractor has a bad credit

records and cannot receive a loan from the bank or get a loan with higher interest rates, issuing bonds with discount is an alternative way to get construction funding. In issuing a bond at a discount, the contractor would get less than face value of the bond, and needs to pay higher interest. However, an experienced government would avoid delivering PPP projects to companies that are unable to access low cost loans.

There are numerous kinds of loan rates on the market. Considering the accessibility and popularity, this research will select the most representative loan rates from each country. In the United States, the prime rate (3.5%) from the Wall Street Journal (2016) would be the most accessible, and it would be the assumed loan rate of the White Creek Apartments project.

The interest rates of Prince House would be the Interest Rate on New Loans of Five Leading Banks (2.69%) referred from the Central Bank of Taiwan (2016). Belfour Betty Campus Solutions chose the bond as its financial instrument for White Creek Apartments rather than its own equity or bank loans. Therefore, the research would use the prime rate (3.5%) mentioned above as the interest rate, and also use it as the bond interest rate in calculating the cost of white Creek Apartments.

The whole contract period cost (including construction cost, maintenance cost, and replacement cost) collected from the official websites is net present value (NPV). Therefore, inflation will apply to the property rentals, student paid rental, and loan interest. To measure inflation, one usually adopts the Consumer Price Index (CPI), and this research will use CPI to convert future value into net present value.

According to the U.S. Bureau of Labor Statistics (2016), the average of CPI Percent Change from 2000 to 2015 is 2.38%. In Taiwan, national statistics compiled by the Directorate-General of Budget Accounting and Statistics (2016) show the average CPI Percent Change from 2000 to 2015 to be 1%.

Although these two on-campus facilities are popular among students, there are some reasons to prevent the dormitory to achieve 100% occupancy, such as withdrawal or replacement. Therefore, this research will take 95% occupancy to calculate the total income from students. Table 16 shows the rates used in the analysis.

Table 16

*Indicators*

| | White Creek Apartments | Prince House |
|---|---|---|
| Interest Rate | 3.5% | 2% |
| | 4% | 2.69% |
| | 4.5% | 3% |
| Inflation Rate | 2.38% | 1% |
| Repayment Years | 10 | 10 |
| | 20 | 20 |
| Occupancy Rate | 95% | 95% |

FINANCIAL FEASIBILITY EVALUATION FORMULAS

This research adopts accounting formulas from Financial Accounting 4th (Thomas Dyckman, 2013) to examine the financial feasibility. The following sets of equation are used for this analysis.

- Rent Income after Adjustment

$$\text{Rent Income after Adjustment} = (\text{Total Rent}) \times (\text{Occupancy Rate})$$

- Land Rent of PPPIP Act project

$$\text{Rent} = (\text{Measurement}) \times (\text{Official Price Value}) \times (5\%) \times (\text{Discount } 60\%)$$

- Project Cost of Prince House

$$\text{Cost} = (\text{equity}) + (\text{loan capital}) + (\text{loan interest})$$

- Project Cost of White Creek Apartments

$$\text{Cost} = (\text{bond face value}) + (\text{bond interest})$$

- Net Present Value (NPV)

$$\text{Net Present Value} = \frac{C_1}{(1+i)^1} + \frac{C_2}{(1+i)^2} + \cdots + \frac{C_n}{(1+i)^n}$$

$$C = (\text{cash flow}) = (\text{yearly rent income})$$

$$i = (\text{Inflation Rate}) = (\text{Consumer Price Index Percent Change})$$

$$n = (\text{Periods})$$

- Interest

$$\text{Future Value} = (\text{Present Value}) \times (1+i)^n$$

$$n = (\text{compounding frequency})$$

$$i = (\text{interest rate})$$

- Present Value of Ordinary Annuity

$$\text{Present Value} = (\text{PMT}) \times \frac{1 - \frac{1}{(1+i)^n}}{i}$$

$$\text{PMT} = (\text{amount of each annuity payment})$$

$$i = (\text{Interest Rate})$$

$$n = (\text{number of periods over which payments are to be made})$$

- Future Value of Ordinary Annuity

$$\text{Future Value} = (\text{PMT}) \times \frac{(1+i)^n - 1}{i}$$

$$\text{PMT} = (\text{amount of each annuity payment})$$

$$i = (\text{Interest Rate})$$

$$n = (\text{number of periods over which payments are to be made})$$

- Present Value of Face Value

$$\text{Present Value} = \frac{1}{(1+i)^n} \times (\text{Face Value Amount})$$

$$n = (\text{number of periods})$$

$$i = (\text{interest rate})$$

WHITE CREEK APARTMENTS WITH DIFFERENT INTEREST RATES

In the Tables 17, 18, and 19, the repayment period would be 10 years, and Tables 20, 21, and 22 show the repayment period to be 20 years under different interest rates.

The interest rate in this research takes into consideration the different economic conditions. The prime rate is 3.5%; however, normally the bank would issue higher interest rates. This is done in order to get more profit from the borrower. Therefore, this research chooses 4% and 4.5% as the control groups.

One higher inflation rate and one lower inflation rate will also be used in this evaluation. Because the average CPI Percent Change of the past 15 years is 2.38%, the lower inflation rate would be 2%, and higher one would be 3%. However, Belfour Betty Campus Solutions choose to issue the bond to finance the project, rather than obtain a loan, so the interest will become higher each year, and the capital will remain at the same face value from the first year to the last year. The bond was sold at face value without premium or discount.

Table 17

*White Creek Apartments with Interest Rate=3.5%, Bond Mature in 10 Years*

| Indicator | Amount | Note |
|---|---|---|
| Whole Contract Period Cost | 104,000,000.00 | total, 10-year-bond |
| Loan | 104,000,000.00 | |
| Down Payment | - | |
| Land Rental Fees | 255,457.00 | per year |
| Inflation Rate | 2.38% | |
| Present Value of Land Rental Fees | 6,021,420.00 | total |
| Rent Income | 12,291,264.00 | if fully occupied |
| Occupancy Rate | 95% | |
| Rent Income after Adjustment | 11,676,700.80 | |
| Present Value of Rent Income | 275,233,849.90 | total |
| Interest Rate | 3.50% | |
| Interest Payment | 5,134,579.49 | per year |
| Present Value of Interest Fees | 42,702,271.12 | total |
| Net Profit of Project | 122,510,158.78 | |

The land rental is $255,457 per year which is referred from the fiscal report from Texas A&M University System. This PPP dormitory is fully funded by tax-exempt bonds without loan or equity, and therefore there is no down payment.

Table 18

*White Creek Apartments with Interest Rate=4%, Bond Mature in 10 Years*

| Indicator | Amount | Note |
|---|---|---|
| Whole Contract Period Cost | 104,000,000.00 | total, 10-year-bond |
| Loan | 104,000,000.00 | |
| Down Payment | - | |
| Land Rental Fees | 255,457.00 | per year |
| Inflation Rate | 2.38% | |
| Present Value of Land Rental Fees | 6,021,420.00 | total |
| Rent Income | 12,291,264.00 | if fully occupied |
| Occupancy Rate | 95% | |
| Rent Income after Adjustment | 11,676,700.80 | |
| Present Value of Rent Income | 275,233,849.90 | total |
| Interest Rate | 4.00% | |
| Interest Payment | 6,157,854.00 | per year |
| Present Value of Interest Fees | 49,945,738.01 | total |
| Net Profit of Project | 115,266,691.89 | |

Under the same repayment period, the lowest rate (3%) and the highest rate (4.5%) would have 13% difference in the net profit

Table 19

*White Creek Apartments with Interest Rate=4.5%, Bond Mature in 10 Years*

| Indicator | Amount | Note |
|---|---|---|
| Whole Contract Period Cost | 104,000,000.00 | total, 10-year-bond |
| Loan | 104,000,000.00 | |
| Down Payment | - | |
| Land Rental Fees | 255,457.00 | per year |
| Inflation Rate | 2.38% | |
| Present Value of Land Rental Fees | 6,021,420.00 | total |
| Rent Income | 12,291,264.00 | if fully occupied |
| Occupancy Rate | 95% | |
| Rent Income after Adjustment | 11,676,700.80 | |
| Present Value of Rent Income | 275,233,849.90 | total |
| Interest Rate | 4.50% | |
| Interest Payment | 7,267,896.89 | per year |
| Present Value of Interest Fees | 57,508,819.83 | total |
| Net Profit of Project | 107,703,610.07 | |

WHITE CREEK APARTMENTS WITH DIFFERENT BOND REPAYMENT PERIOD

During the second-round evaluation, this research will test the project's financial feasibility under longer repayment, which is 20 years. Table 20, 21, and 22 show the three control groups were given with the different interest rates, 3%, 3.5%, and 4%, the same as the previous round.

After the analysis, the difference of the three groups is obvious that under the same repayment period, the lowest rate (3%) is almost four times the highest rate (4.5%) in net profit.

Table 20

*White Creek Apartments with Interest Rate=3.5%, Bond Mature in 20 Years*

| Indicator | Amount | Note |
|---|---|---|
| Whole Contract Period Cost | 104,000,000.00 | total, 20-year-bond |
| Loan | 104,000,000.00 | |
| Down Payment | - | |
| Land Rental Fees | 255,457.00 | per year |
| Inflation Rate | 2.38% | |
| Present Value of Land Rental Fees | 6,021,420.00 | total |
| Rent Income | 12,291,264.00 | if fully occupied |
| Occupancy Rate | 95% | |
| Rent Income after Adjustment | 11,676,700.80 | |
| Present Value of Rent Income | 275,233,849.90 | total |
| Interest Rate | 3.50% | |
| Interest Payment | 7,242,831.46 | per year |
| Present Value of Interest Fees | 102,938,041.80 | total |
| Net Profit of Project | 62,274,388.10 | |

Table 21

*White Creek Apartments with Interest Rate=4%, Bond Mature in 20 Years*

| Indicator | Amount | Note |
|---|---|---|
| Whole Contract Period Cost | 104,000,000.00 | total, 20-year-bond |
| Loan | 104,000,000.00 | |
| Down Payment | - | |
| Land Rental Fees | 255,457.00 | per year |
| Inflation Rate | 2.38% | |
| Present Value of Land Rental Fees | 6,021,420.00 | total |
| Rent Income | 12,291,264.00 | if fully occupied |
| Occupancy Rate | 95% | |
| Rent Income after Adjustment | 11,676,700.80 | |
| Present Value of Rent Income | 275,233,849.90 | total |
| Interest Rate | 4.00% | |
| Interest Payment | 9,115,059.20 | per year |
| Present Value of Interest Fees | 123,876,662.50 | total |
| Net Profit of Project | 41,335,767.40 | |

Table 22

*White Creek Apartments with Interest Rate=4.5%, Bond Mature in 20 Years*

| Indicator | Amount | Note |
|---|---|---|
| Whole Contract Period Cost | 104,000,000.00 | total, 20-year-bond |
| Loan | 104,000,000.00 | |
| Down Payment | - | |
| Land Rental Fees | 255,457.00 | per year |
| Inflation Rate | 2.38% | |
| Present Value of Land Rental Fees | 6,021,420.00 | total |
| Rent Income | 12,291,264.00 | if fully occupied |
| Occupancy Rate | 95% | |
| Rent Income after Adjustment | 11,676,700.80 | |
| Present Value of Rent Income | 275,233,849.90 | total |
| Interest Rate | 4.50% | |
| Interest Payment | 11,286,821.64 | per year |
| Present Value of Interest Fees | 146,818,258.60 | total |
| Net Profit of Project | 18,394,171.30 | |

Figure 35 shows that the short-term repayment period has more net profit than longer ones. Moreover, the interest rate does not affect the net profit so much. However, under the long-term repayment period, the total interest amount would become much larger. The reason is the capital would not decrease and the bond issuer needs to pay the same interest during the whole period, so the more repayment years, the more interest must be paid.

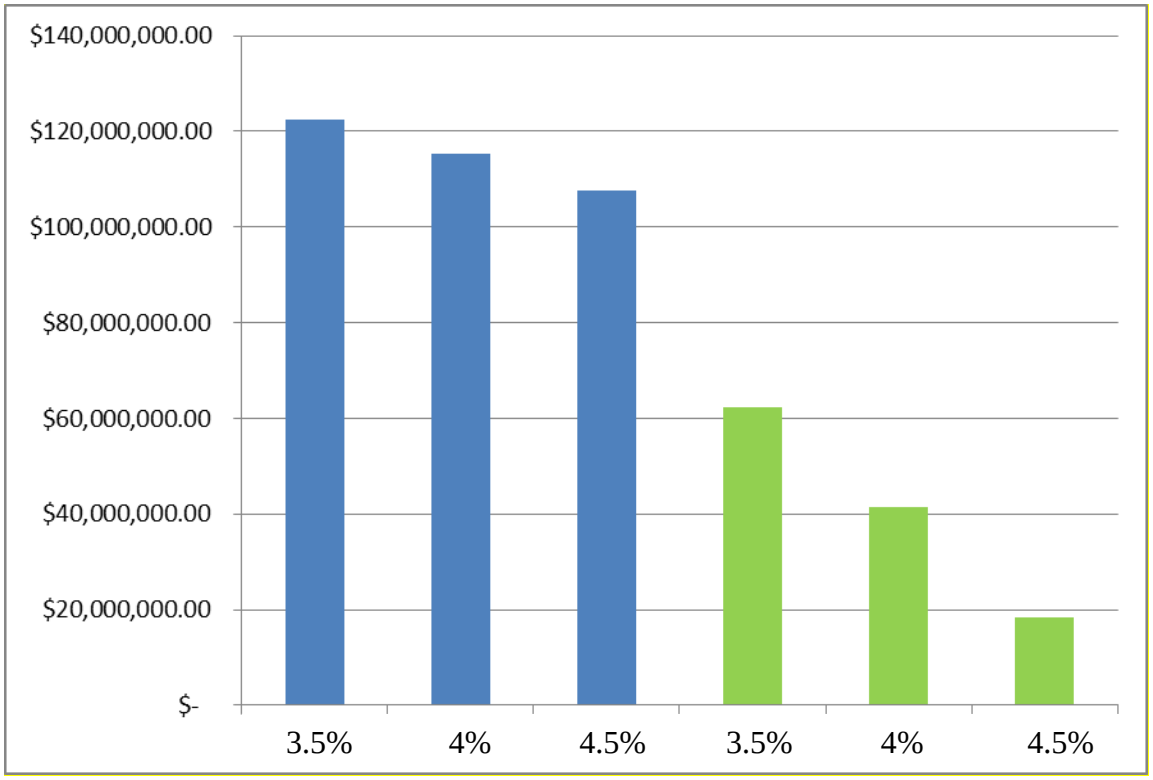



*Figure 35.* Net Profit of White Creek Apartments

PRINCE HOUSE WITH DIFFERENT INTEREST RATES

The total investment of Prince House was estimated as NTD$2,927,368,000. Prince Corp. chose another way to fund the project. According to the PPP contract between National Taiwan University and Prince Corp., the private company has to invest its equity in the project at no less than 30% of the construction cost. Therefore, the down payment of the Prince House project is NTD$23,820,208.

Prince Corp. signed a twenty-year syndicated loan contract with Mega International Commercial Bank on January 19, 2007. Mega Bank is also the agent of the consortium, including seven banks, which issued a loan of NTD$2.16 billion. However, Prince Corp. did not use the entire amount of the credit from the syndicated loan contract.

The loan interest was guaranteed by the government under PPPIP Act. Therefore, the Interest Rate on New Loans of Five Leading Banks, 2.69%, could be considered as the project interest rate.

Below, this research tests the financial feasibility under a better economic condition or a worse one, and the control groups will have interest rates of 2% and 3%.

Following the procedure for White Creek Apartments, Tables 23, 24, and 25 show the financial feasibility of different interest rates under a 10-year repayment period.

Table 23

*Prince House with Interest Rate=2%, Loan Cleared in 10 Years*

| Indicator | Amount | Note |
|---|---|---|
| Whole Contract Period Cost | 90,869,719.00 | total 35 years |
| Loan | 67,049,511.00 | |
| Down Payment | 23,820,208.00 | |
| Land Rental Fees | 2,245,114.23 | per year |
| Inflation Rate | 1.00% | |
| Present Value of Land Rental Fees | 66,025,621.44 | total |
| Rent Income | 8,276,424.00 | if fully occupied |
| Occupancy Rate | 95% | |
| Rent Income after Adjustment | 7,862,602.80 | |
| Present Value of Rent Income | 231,227,983.50 | total |
| Interest Rate | 2.00% | |
| Interest and Principal Payment | 7,464,385.00 | per year |
| Present Value of Principal Payment and Interest Fees | 70,697,429.65 | total |
| Net Profit of Project | 70,684,724.41 | |

Table 24

*Prince House with Interest Rate=2.69%, Loan Cleared in 10 Years*

| Indicator | Amount | Note |
|---|---|---|
| Whole Contract Period Cost | 90,869,719.00 | total 35 years |
| Loan | 67,049,511.00 | |
| Down Payment | 23,820,208.00 | |
| Land Rental Fees | 2,245,114.23 | per year |
| Inflation Rate | 1.00% | |
| Present Value of Land Rental Fees | 66,025,621.44 | total |
| Rent Income | 8,276,424.00 | if fully occupied |
| Occupancy Rate | 95% | |
| Rent Income after Adjustment | 7,862,602.80 | |
| Present Value of Rent Income | 231,227,983.50 | total |
| Interest Rate | 2.69% | |
| Interest and Principal Payment | 7,736,407.65 | per year |
| Present Value of Principal Payment and Interest Fees | 73,273,837.77 | total |
| Net Profit of Project | 68,108,316.29 | |

Table 25

*Prince House with Interest Rate=3%, Loan Cleared in 10 Years*

| Indicator | Amount | Note |
|---|---|---|
| Whole Contract Period Cost | 90,869,719.00 | total 35 years |
| Loan | 67,049,511.00 | |
| Down Payment | 23,820,208.00 | |
| Land Rental Fees | 2,245,114.23 | per year |
| Inflation Rate | 1.00% | |
| Present Value of Land Rental Fees | 66,025,621.44 | total |
| Rent Income | 8,276,424.00 | if fully occupied |
| Occupancy Rate | 95% | |
| Rent Income after Adjustment | 7,862,602.80 | |
| Present Value of Rent Income | 231,227,983.50 | total |
| Interest Rate | 3.00% | |
| Interest and Principal Payment | 7,860,250.76 | per year |
| Present Value of Principal Payment and Interest Fees | 74,446,793.02 | total |
| Net Profit of Project | 66,935,361.04 | |

If the repayment period remains the same, the lowest rate (2%) will generate 5% net profit more than the highest rate (3%).

PRINCE HOUSE WITH DIFFERENT LOAN REPAYMENT PERIOD

Tables 26, 27, and 28 show the net project profit with different interest rates under the 20-year repayment. Meanwhile the control groups still have the same interest rates of 2% and 3%.

After the analysis, when the repayment period becomes 20 years, the highest interest rate (3%) will have 12% lower profit than the lowest one (2%). Comparing to the previous round, the highest interest rate (3%) with longer repayment (20 years) would generate the significant less net project profit than the shorter repayment (10 years) one.

Table 26

*Prince House with Interest Rate=2%, Loan Cleared in 20 Years*

| Indicator | Amount | Note |
|---|---|---|
| Whole Contract Period Cost | 90,869,719.00 | total 35 years |
| Loan | 67,049,511.00 | |
| Down Payment | 23,820,208.00 | |
| Land Rental Fees | 2,245,114.23 | per year |
| Inflation Rate | 1.00% | |
| Present Value of Land Rental Fees | 66,025,621.44 | total |
| Rent Income | 8,276,424.00 | if fully occupied |
| Occupancy Rate | 95% | |
| Rent Income after Adjustment | 7,862,602.80 | |
| Present Value of Rent Income | 231,227,983.50 | total |
| Interest Rate | 2.00% | |
| Interest and Principal Payment | 4,100,528.88 | per year |
| Present Value of Principal Payment and Interest Fees | 73,996,298.99 | total |
| Net Profit of Project | 67,385,855.07 | |

*Table 27*

*Prince House with Interest Rate=2.69%, Loan Cleared in 20 Years*

| Indicator | Amount | Note |
|---|---|---|
| Whole Contract Period Cost | 90,869,719.00 | total 35 years |
| Loan | 67,049,511.00 | |
| Down Payment | 23,820,208.00 | |
| Land Rental Fees | 2,245,114.23 | per year |
| Inflation Rate | 1.00% | |
| Present Value of Land Rental Fees | 66,025,621.44 | total |
| Rent Income | 8,276,424.00 | if fully occupied |
| Occupancy Rate | 95% | |
| Rent Income after Adjustment | 7,862,602.80 | |
| Present Value of Rent Income | 231,227,983.50 | total |
| Interest Rate | 2.69% | |
| Interest and Principal Payment | 4,378,603.46 | per year |
| Present Value of Principal Payment and Interest Fees | 79,014,307.67 | total |
| Net Profit of Project | 62,367,846.39 | |

Table 28

*Prince House with Interest Rate=3%, Loan Cleared in 20 Years*

| Indicator | Amount | Note |
|---|---|---|
| Whole Contract Period Cost | 90,869,719.00 | total 35 years |
| Loan | 67,049,511.00 | |
| Down Payment | 23,820,208.00 | |
| Land Rental Fees | 2,245,114.23 | per year |
| Inflation Rate | 1.00% | |
| Present Value of Land Rental Fees | 66,025,621.44 | total |
| Rent Income | 8,276,424.00 | if fully occupied |
| Occupancy Rate | 95% | |
| Rent Income after Adjustment | 7,862,602.80 | |
| Present Value of Rent Income | 231,227,983.50 | total |
| Interest Rate | 3.00% | |
| Interest and Principal Payment | 4,506,781.80 | per year |
| Present Value of Principal Payment and Interest Fees | 81,327,356.28 | total |
| Net Profit of Project | 60,054,797.78 | |

Under the model with equity and loan, the difference between 10-year and 20-year repayment periods is less than under the model with bonds. The lowest interest rate in the twenty-year group might yield a higher profit than a ten-year project that has a higher interest rate.

The reason for the above finding is that the loan repayment will include both the capital and interest, and therefore, a longer payment period might leave less capital to generate less interest.

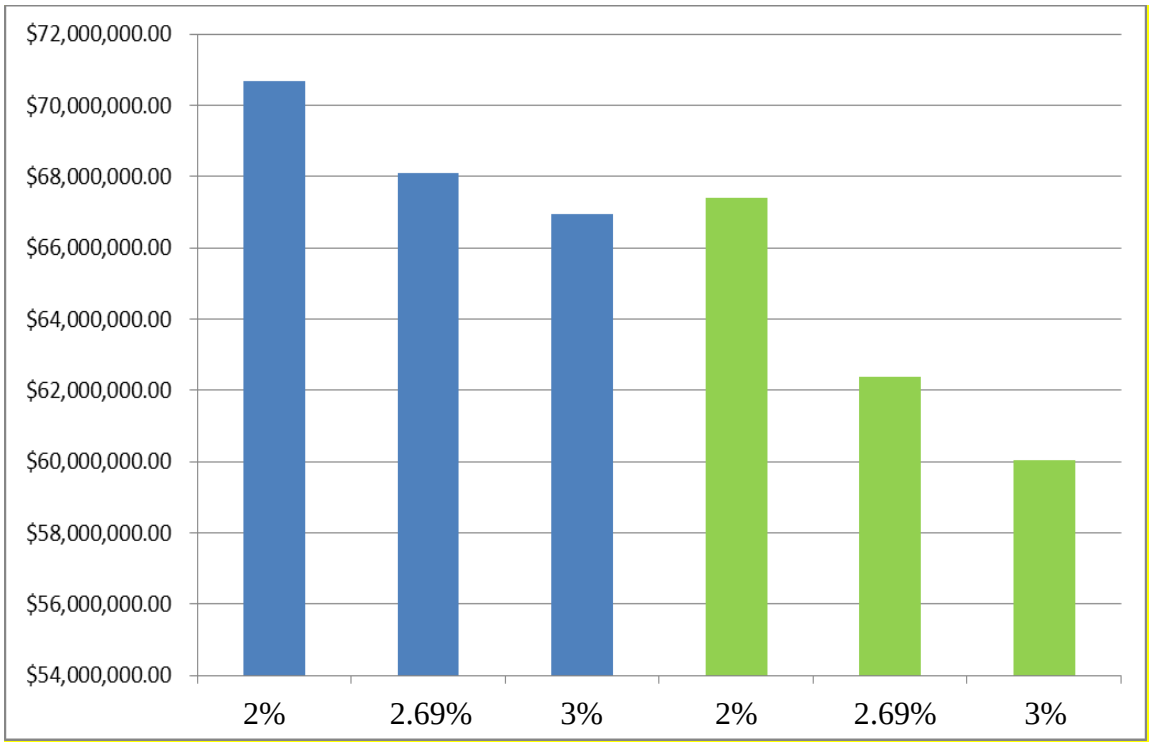



*Figure 36.* Net Profit of Prince House

# CONCLUSION

Both White Creek Apartments and Prince House can remain profitable under the given conditions. Thus, the hypothesis that Public-Private Partnerships are financially robust against diverse economic circumstances was shown to be correct. Also, the different interest rates affect the net profit as expected.

White Creek Apartments yields more profits. The reason is that its floor plan is designed with more four-bedroom than two-bedroom or single-bedroom units. Prince House has more twin rooms and single rooms. Four-bedroom units are more profitable.

The most significant result is the impact of long-term bonds. Even though White Creek Apartments is such a profitable project, long-term bonds will make most of the profit vanish.

# CHAPTER VI

# CONCLUSIONS

Along with the increased enrollment, most higher education institutions are facing the problem of shortages and outdatedness of on-campus dormitories. Therefore, both Texas A&M University and National Taiwan University have developed new on-campus dormitory projects, White Creek Apartments and Prince House, by Public-Private Partnerships.

Following the introduction of two dormitories, it was shown that the major differences between the two dormitory projects are the project delivery method, funding source, and the provided service including facilities and amenities. After leveling by the Big Mac Index, the two dormitories can be compared with each other.

During the financial feasibility analysis, a difference in the sources of funding credit was shown to lead to different financial impacts. Therefore, at the beginning of the project, a dormitory project planner could choose the equity, bank loan, or bond as the financial resource based on the desired repayment method or ability to pay more interest. The research expected that the interest rates would be the most significant reason for declining profits, but the result does not support this.

Afterward, the research made a deeper finding that the repayment period would impact the whole project net profits more than finance resources or interest rates. The financial analysis shows that the long-term debts generate more interest cost no matter which type of financial resources are involved. Repaying as early as possible could help the project to keep more profits.

Finally, the financial feasibility analyses of these two dormitory projects both indicate positive prospects, even though they adopted different lending methods. Under the worsening economic conditions or rising interest rates, the projects still can generate and maintain a positive net profit. The research proves that Public-Private Partnerships can lead to good service, high quality, and low risk on-campus student housing.

In this thesis, two major projects financed by Public-Private Partnerships were examined. Using data from these projects, the interest rate and repayment period were varied, and resilience of Public-Private Partnership as a financing method was tested. In every economic situation tested, PPP financing was found to be viable. Thus, the hypothesis that projects financed by Public-Private Partnerships are financially robust against diverse economic circumstances was shown to be true.

There are more lending methods and more detailed finance analysis models, which could be topics for future studies.

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